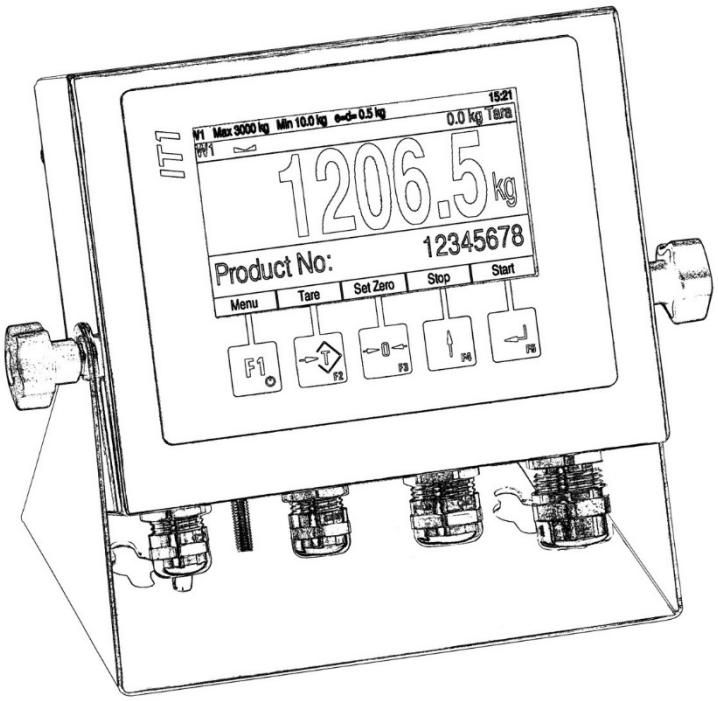
Discover smart weighing

Technical Manual

IT1



Industrial Weighing Terminal

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Please Note:

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Technical Manual IT1

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This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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Conforms to UL STD 62368-1
Certified to CAN/CSA STD C22.2 No. 62368-1

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Supplier's Declaration of Conformity

This Declaration of Conformity is hereby issued according to Chapter 1, Subpart A, Part 2 of Title 47 of the Code of Federal Regulations by:

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IT1

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RESPONSIBLE PARTY located in the United States:

Violette Engineering Corporation
313 Park Avenue, Suite 300
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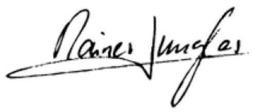
The responsible party warrants that each unit of equipment marketed under this Declaration of Conformity will be identical to the unit tested and found acceptable with the standards and that the records maintained by the responsible party continue to reflect the equipment being produced under such Supplier's Declaration of Conformity continue to comply within the variation that can be expected due to quantity production and testing on a statistical basis.



Rainer Junglas
General Manager

Date: 10. Aug. 2022

Contents

1 Introduction

IT1 is a universal weighing terminal for weighing, data capturing and filling applications. It is available in three versions, for connection to AC supply (IT1-AC), DC supply (IT1-DC) and for supply through external batteries (IT1-BATT), and with four different housing versions, wall-mount/desk-top version, panel-mount version, Blackbox, or JunctionBox (for further details about Blackbox and JunctionBox versions see Technical Manual IT1 Blackbox/JunctionBox).

This manual contains information and technical data for use, installation and operation of the device.

The present technical manual is to be considered part of the product and must be kept for the complete life duration of the product. In case the product should be passed on to a successive user then the technical manual must also be included.

Further information is provided in the following manuals:

- Technical Manual IT1 Blackbox/JunctionBox, order No. ST.2309.1924
- Calibration Manual IT1/IT3 ADM/DADM, order No. ST.2309.1771
- Calibration Manual IT1/IT3 Digital Scale Connection, order No. ST.2309.1781
- Calibration Manual IT1/IT3 IDNet MultiRange, order No. ST.2309.1776
- Calibration Manual IT1/IT3 Minebea Intec IS, order No. ST.2309.1891
- Operation Manual IT1, order No. ST.2309.1761
- Web Interface Operation Manual, order No. ST.2309.1692
- PC *ScaleView* Operation Manual, order No. ST.2309.2070
- Installation Instructions IT1 Remote Display, order No. ST.2309.1929
- IT *CONFIGURATOR* Operation Manual, order No. ST.2309.1971
- Continuous Output Technical Manual, order No. ST.2309.2023
- ADCBox Installation Instructions, order No. ST.2309.0556

1.1 Safety Symbols Used In This Manual

Safety relevant information is shown with corresponding symbols as follows:

W A R N I N G
Failure to observe this precaution could result in serious injuries or fatal accidents. Please make absolutely sure that these precautions are observed in order to ensure safe operation of the equipment.

CAUTION
Failure to observe this precaution could result in damage to or destruction of the equipment or bodily harm! Please make absolutely sure that these precautions are observed in order to ensure safe operation of the equipment.

Note: This indicates an advice for the designated use of the equipment and/or additional information to avoid inappropriate handling.

1.2 General Safety Advice

W A R N I N G
Disconnect all power to this device before opening the housing! Risk of electrical shock!

W A R N I N G
Exercise utmost care when making checks, tests and adjustments that can actuate movable parts such as feeding devices, gates, flaps, conveyors, etc. Make absolutely sure that nobody is within reach of movable parts.
Failure to observe this precaution could result in bodily injury!

W A R N I N G
This device must not be operated in a potentially explosive atmosphere! It is the sole responsibility of the user to classify the area of installation (zones, groups, temperature classes). To this effect, the assistance of the competent Labor Inspectorate or the Technical Inspection Services may be called upon.

W A R N I N G
For the storage of volatile data the device contains a battery. Risk of explosion if battery is replaced improperly! Replace only with battery of the same type or with compatible type recommended by manufacturer. Disposal of used batteries only as indicated by manufacturer.

W A R N I N G
When this device is included as a component part of a system, the resulting system design must be reviewed by qualified personnel who are familiar with the construction and operation of all individual components in the system and the potential hazards involved. Failure to observe this precaution could result in bodily injury!

W A R N I N G
This device must be installed, serviced, and operated in strict compliance with all locally applicable safety regulations and the rules for the prevention of accidents!

W A R N I N G
The power supply unit provides SELV voltages in accordance with EN 62368. Make sure that any peripheral device connected to the weighing terminal containing its own power supply also uses SELV voltages!

CAUTION
Input voltage of the device must comply with local mains supply!

CAUTION
If this device is used in an automatic or manual filling cycle, all users must provide a hard wired emergency stop circuit outside the device circuitry.

CAUTION
This device and its associated equipment must be installed, adjusted and maintained by qualified personnel only!

CAUTION
If the line cord with connector is used as the means to separate the device from the mains, the wall outlet must be installed close to the device and must be easily accessible! If a permanently connected mains cable is used, an easily accessible separator must be included in the supply circuit!

W A R N I N G
The device uses the short-circuit / overcurrent protection of the on-site mains supply.

Compliance with the following safety instruction is mandatory for UL approved units:

CAUTION
For power supply of the IT1-DC use LPS and/or NEC class 2 power supply units only.

Notes:

- This device is suitable for use in up to 5,000 m AMSL.
- This device may be installed in outdoor area, with protection against direct weather influence and sunlight.
- When installing the panel-mount version in outdoor area, the housing or switch cabinet must also be suitable for outdoor use.
- The unit has a configurable on/off key. If this key is deactivated, the unit is operational immediately after connection to the power supply! Note: The on/off key does not separate the unit from the mains supply. To deenergize the unit, pull plug of mains cable and / or disconnect the unit from all power sources!
- Only permit qualified personnel to operate this device!
  Disconnect all power to this device before cleaning and servicing!
- All switch gear connected to the unit and/or installed close to it, such as relays and contactors, must be fitted with appropriate components (RC-modules, diodes) to suppress interference.
- In order to avoid static discharge, all metallic parts of a system must be thoroughly grounded. Movable parts, such as portable scales on plastic wheels, must be grounded with earth clamps or earth leads of appropriate diameter.
- Keep this manual for future reference!

1.3 Précautions d’emploi (ETL)

A V E R T I S S E M E N T
Retirez la fiche de réseau avant d'ouvrir l'appareil ou coupez le courant du terminal – Danger de mort !

A V E R T I S S E M E N T
Attention en actionnant les touches de commande des dispositifs de transport, trappe etc. Avant d’actionner ces touches vérifiez que personne ne se trouve dans le périmètre d’action du mouvement.

A V E R T I S S E M E N T
L’IT1 ne pourra pas être utilisé dans un environnement comportant un danger d’explosion. La classification correspondante est en tout cas l’obligation de l’utilisateur (division en catégories : zones, groupes d’explosion, catégories de température etc.). Adressez-vous à ce sujet aux autorités d’inspection locales et aux organismes de contrôle des normes de sécurité.

A V E R T I S S E M E N T
La structure du système doit être contrôlée par des experts qualifiés qui connaissent la construction et la fonction de tous les éléments connectés, si l’appareil fait partie d’un système global !

A V E R T I S S E M E N T
Pour l'installation, les travaux de maintenance et pendant l'utilisation, tenez compte des directives du VDE (association des électriciens allemands) et des consignes locales de sécurité et de prévention des accidents !

A V E R T I S S E M E N T
Le bloc d'alimentation fournit du côté sortie des tensions SELV (très basse tension de sécurité). En cas de raccordement de composants externes (interfaces sérielles, sorties parallèles), assurez-vous qu'il n'y a que des tensions SELV.

ATTENTION
La tension du réseau local doit correspondre à la tension d'entrée de l'appareil !

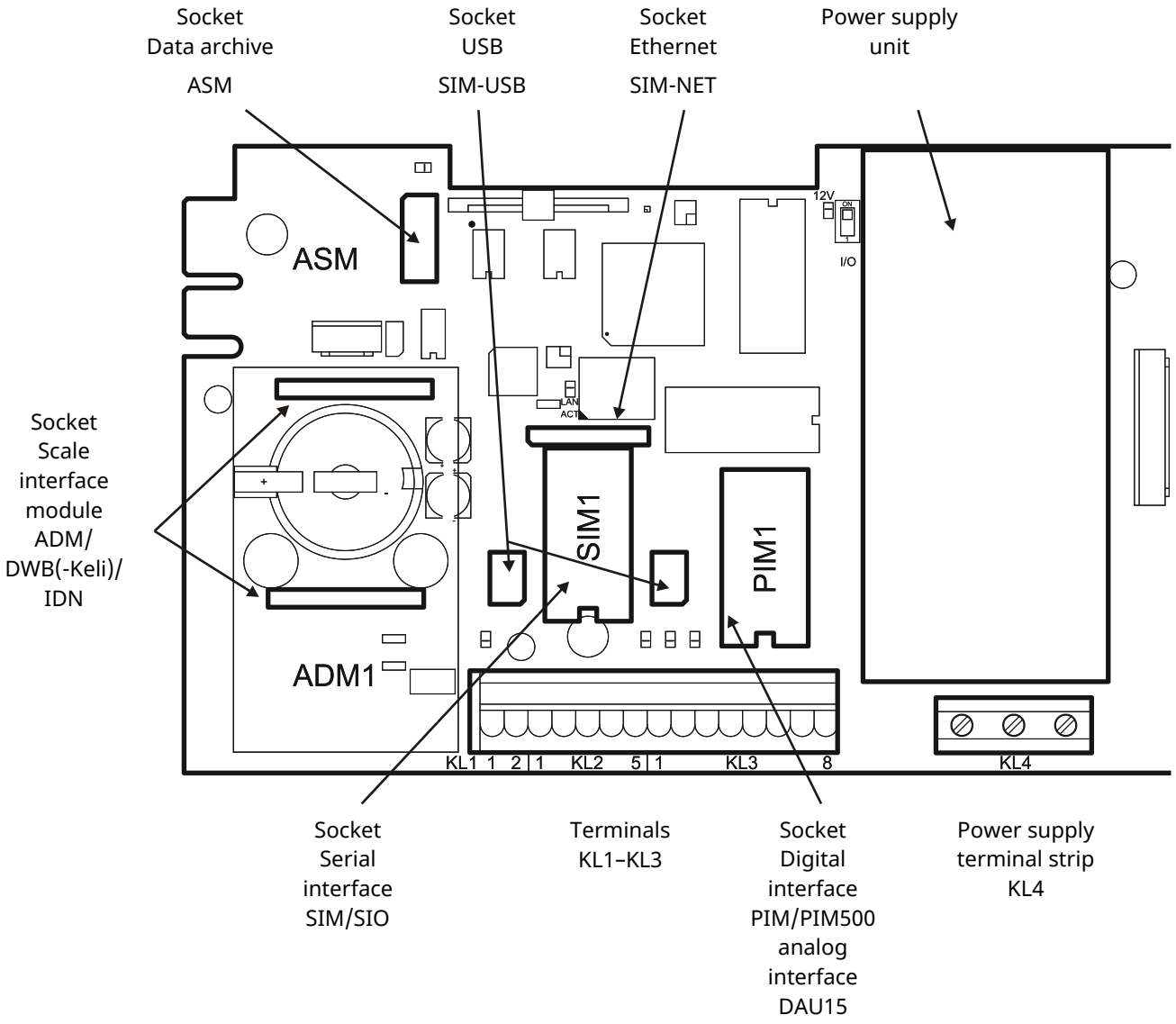
ATTENTION
Cet appareil et ses périphériques ne doivent être installés, ajustés et entretenus que par un personnel qualifié.

ATTENTION
La prise doit se trouver à proximité immédiate de l’appareil et son accès doit être facile, si l’on relie le terminal de pesage par un câble de réseau avec une fiche. Prévoir un dispositif de séparation facilement accessible au circuit d’alimentation, si la connexion est fixe.

ATTENTION
L'appareil utilise la protection contre les courts-circuits / dispositif de protection contre les surintensités des bâtiments installés sur site.

2 System Description

This weighing terminal features a modular design with plug-on modules. Mainboard CPU1:



LEDs on Main Board

LED	Function	
D208	3V3	3.3 V CPU logic
D210	5V	5 V peripherals
D207	12V	12 V peripherals
Ethernet interface:		
D500	LAN	Traffic / connected
ADM scale module:		
D209	ANA:5V	5 V for ADM
External power supply:		
D106	12V_SW	12 V for peripheral devices

Note: Only one option either SIM-USB **or** SIM-NET **or** SIM **or** SIO can be used. Simultaneous use of more than one option is not allowed!

For connection of the individual plug-on modules, refer to chapter 'Installation.'

3 Installation

3.1 Safety Advice

W A R N I N G
Disconnect all power to the device and/or unplug line cord before opening the housing!
Failure to observe this precaution could result in bodily injury!

W A R N I N G
Use crimped wire end ferrules with plastic collar on stranded cables and avoid protruding wires!
Applicable to IT1-AC only:
The primary part of the power supply (line cord to PSU) must not touch any parts of the secondary power supply (from output PSU on).
This applies in particular in case an individual wire may come off the screw terminal.
This can be made sure by:

- **Cutting all wires connected to the primary part as short as possible and securing them with cable binders so that they cannot touch the secondary part!**
- **Cutting all wires connected to the secondary part as short as possible and securing them with cable binders so that they cannot touch the primary part!**

CAUTION
Transport and storage of electronic components such as boards, EPROMs, etc. must only be made in suitable anti-static ESD bags or cases.

Compliance with the following safety instructions is mandatory for UL approved units:

CAUTION
For power supply of the IT1-DC use LPS and/or NEC class 2 power supply units only.

CAUTION
Use UL-approved cables only for connections to the weighing terminal.

- Only suitable cables may be connected to the 24 V power supply unit, complying with the specification below:
  - U_N > 30 V;
  - suitable for the environmental conditions prevailing at site of installation (indoor / outdoor / temperature / humidity);
  - UL approval (e.g. category AVLV2, QPTZ or DUZX);
  - gauge 26 < AWG < 16;
  - diameter of cable 4 mm < d < 8 mm.

Note: The shielding measures for the connection of cables described in the following must absolutely be adhered to. Insufficient shielding may lead to electromagnetic interference and/or emissions, that can affect the operational safety of the device.

3.2 Setup Of The Device

3.2.1 Operating Environment

Ambient temperature for operating the unit may range from –10 °C to +40 °C, at a maximum of 95 % relative humidity, without condensation. When installed in outdoor area, it is strongly recommended to protect the device against harmful environmental influences, e.g. rain and moisture, direct sunlight or extreme changes of temperature. In the proximity of saltwater sources (e.g. near the sea), a natural long-term corrosion may be experienced, caused by saline air. If this is the case, appropriate precautionary measures should be taken. The place of installation should not be chosen near sources of heat or cold. Also, the effects of external forces such as vibrations, shocks or sudden acceleration should be avoided.

3.2.2 Securing Unit For Wall-Mount Installation

Compliance with the following safety instructions is mandatory for UL approved units:

The mounting bracket is used for both, wall-mount or desk-top installation and must be fixed with appropriate screws to ensure resistance against all external forces the device is subjected to. Apart from its own weight, this can be force applied by operating the unit (key stroke) or the weight of connected cables.

In order to comply with UL guidelines, the component (retainer) must only be secured with the fixing materials described below. The positions of the fixing holes for the device are shown in the chapter 'Dimensions.'

Fixing to metal:

Type	Screw type [1])
A	M6 x 12
	Note [1]) represents min. length

Fixing to reinforced concrete:

Type	Screw type [1])	Plug type (Nylon)
A	6 x 40 mm	8 mm, e.g. Fischer S8, type No.: 50108
	Note [1]) represents min. length	

Ensure that the wall or ceiling can hold four times the total weight of the device.

When the desk-top version is installed without fixing, ensure a firm stand.

3.2.3 Panel-Mount Installation

The cut-out for the installation of the device must comply with the specification. The thickness of the material with the cut-out should be 2–3 mm.

3.2.4 Installation Notes

Operational safety of users and environment is the essential concern for all installation variants. Ensure proper and appropriate installation. This also applies to all connected cables.

For wall-mount applications the terminal can be fixed at the wall first, the connection cables can be fitted later with the lid of the housing open. Before putting the device into operation, the housing must be closed and securely tightened with the hexagonal nuts provided. The nuts must be tightened crosswise with a torque of 1.0 Nm. The screw clamps of the panel-mount version must be tightened crosswise with a torque of 0.3 Nm. For the proper operation of the unit, all fastening parts that are part of the supply must be fastened appropriately.

All screws, holes, brackets or similar fastening parts may only be used as intended and must not be used in any other way. Furthermore, improper modifications to the housing (such as drilling of holes, or installation of non-original parts) must not be made. Changes of this nature will invalidate the approval, may lead to ingress of moisture and ultimately invalidate the warranty. Liability for any modifications is solely borne by the installer of the device.

3.2.5 Degree Of Pollution

The different types of housings are suitable for environment with pollution degree 1–4. This applies to the panel-mount version only when the inside of the switch cabinet is sufficiently protected against the ingress of dirt or moisture. When the unit is installed or serviced and the switch cabinet and/or the housing of the device is open, it must also be made sure that no pollution can penetrate the inside.

For detailed information on the degree of pollution, refer to the IEC 61010-1 standard.

3.2.6 Equipotential Bonding

The housing is equipped with a bolt for potential equalization (PA stud) and it is absolutely mandatory to connect it to the equipotential bonding system of the installation. This is crucial for safe and undisturbed operation. The connecting cable must have a min. cross section of 4 mm² and should be kept as short as

possible. Connection to the PA bolt should be made with a ring cable lug properly secured with serrated washer and nut. The max. permissible torque of the nut is 8 Nm. It is desirable to install a star-shaped system for the equipotential bonding to minimize possible compensating currents.

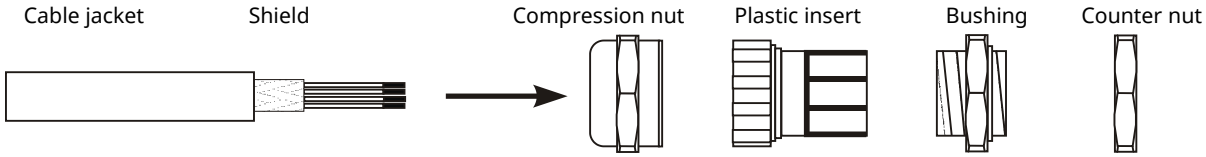
3.3 Connection Of Cables

The housings have cable glands of different sizes and clamping ranges. Cable glands not already closed by factory-installed cables are sealed with dummy plugs or special sealing inserts. The dummy plugs can simply be pulled out before the installation of cables. The special sealing inserts have a thin membrane that can be removed with an appropriate tool, while doing that make sure that the rubber seal is not damaged.

When cable glands are not used for the introduction of cables, the compression nut must be tightened as required by the size of the sealing insert. Cable glands with dummy plugs must be handled as if cables were installed (see table of torques chapter 3.3.1). Compression nuts of cable glands with closed sealing insert must be tightened until the insert forms a slight ball-shaped surface. If tightened too much, it may come to the formation of cracks in the sealing membrane.

3.3.1 Cable Installation

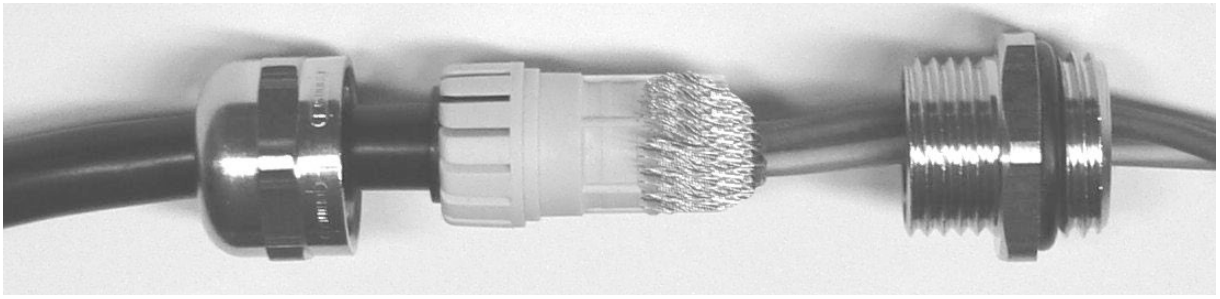
All cables are led into the housing through cable glands.



1 Slide compression nut over cable jacket;

2 Slide plastic insert (retainer) over cable jacket until inner end is aligned with cut end of jacket;

3 Unravel shield, bend over retainer and push into retaining comb to ensure good conductive contact with housing. Cut wires of shield to length of comb, avoid protruding wires that would endanger tightness of cable gland;



4 Insert retainer with cable into bushing;

5 Screw compression nut onto bushing and tighten securely. The torque must be chosen according to the diameter of the cable and the characteristics of its jacket. The following table shows the guideline torque values.

Permissible diameter of cable and approximate torque for cable glands:

Size of wrench for compression nut	Permissible diameter of cable	Torque for compression nut
SW 17	4–8 mm	6 Nm
SW 20	5–10 mm	5 Nm
SW 22	6–12 mm	8 Nm

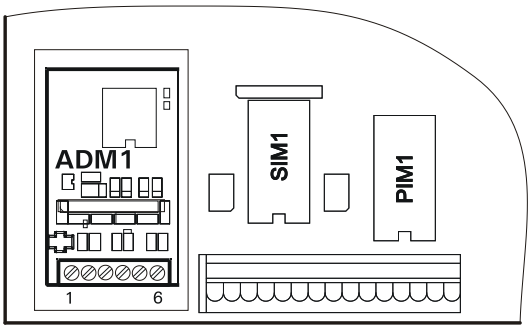
W A R N I N G
Cut cable ends as short as possible and make sure that they cannot touch any parts conducting mains voltage (mains cable, power supply unit)!
Use wire end ferrules with plastic collar on stranded cables and avoid protruding wires!

3.4 Overview Connections

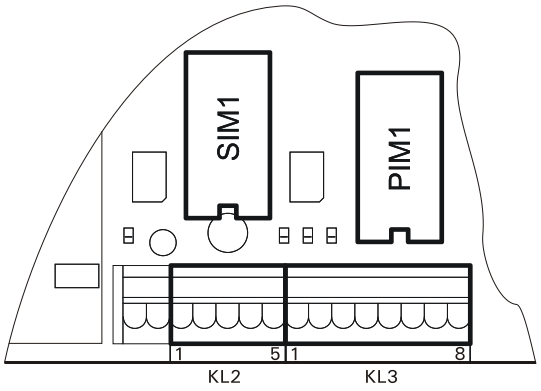
3.4.1 ADM

6 wire	
1	+Excitation
2	– Excitation
3	+Sense
4	– Sense
5	+Signal
6	– Signal

4 wire	
1	+Excitation
2	– Excitation
3	Jump lead to +Excitation
4	Jump lead to – Excitation
5	+Signal
6	– Signal



3.4.2 Main Module



KL1: Power supply peripheral units	
Terminal	
1	0 V
2	+12 V
⚠	Attention: For max. permissible current drain see chapter 'Power supply of external units'!

KL2: Serial interface in socket SIM1			
Terminal	**RS232**	**20 mA**	**RS485 4 wire/OPTO**
1	TxD	TX_{IN}	Tx A (Tx+)
2	RTS	TX_{OUT}	Tx B (Tx—)
3	RxD	RX_{IN}	Rx A (Rx+)
4	CTS	RX_{OUT}	Rx B (Rx—)
5	Gnd	—	—

KL3: Digital inputs and outputs PIM/PIM500 in socket PIM1		
1	0V	
2	+12V	for external switches only!
3	IN0	
4	IN1	
5	IN–	PIM: for IN0–IN1
		PIM500: for IN0–IN1 and OUT0–OUT1
6	OUT0	
7	OUT1	
8	OUT+	for OUT0–OUT1
⚠		Attention: For max. permissible current drain see chapter 'Power supply of external units'!

KL3: Analog output DAU15 in socket PIM1		
1		
2		
3	I+	Current output 0/4–20 mA
4	I–	Gnd for current output 0/4–20 mA
5		
6	U+	Voltage output 0/2–10 V
7	U–	Gnd for voltage output 0/2–10 V
8		

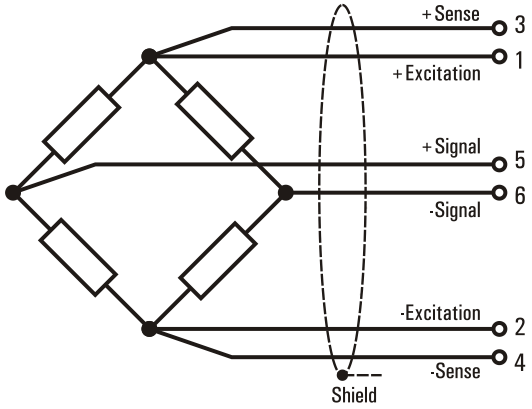
3.5 Connection Of Scale

3.5.1 Connection Of Analog Scale To ADM

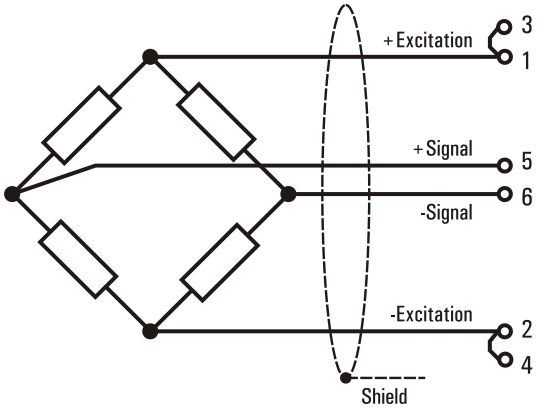
The **A**nalog **D**igital **M**odule ADM provides connection for weighing platforms and load cells as specified below:

- Max. 8 strain gauge load cells 350 Ω each,
- Overall impedance 43 Ω ... 3300 Ω
- W&M approved resolution of 10,000 e, internal resolution 524,000 d
- Smallest permissible input signal for approved applications: 0.33 µV / e
- Update rate 50–800 updates / second (selectable in Service Mode)
- Load cell excitation: 5 V ±5 % (gated supply)
- Connection in 4-wire or 6-wire mode.

Principal schematics of 6-wire and 4-wire strain gauge load cell



6-wire load cell



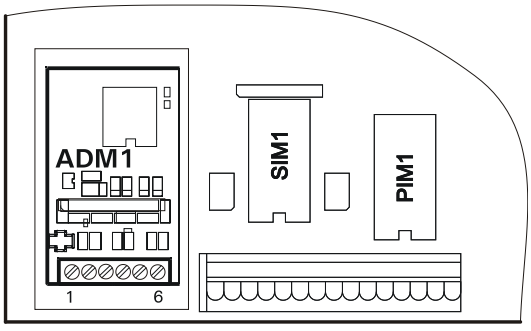
4-wire load cell

The following connection values must also be observed:

Cross section (rigid wires):	0.14–1.5 mm²
Cross section (flexible wire with insulated wire end ferrule):	0.25–1.5 mm²
Cross section (2 identical flexible wires with insulated TWIN wire end ferrule):	0.5–0.75 mm²
Length of stripped insulation:	6 mm
Torque:	0.5–0.6 Nm

Connection of 6-wire analog load cell(s) to the ADM module:

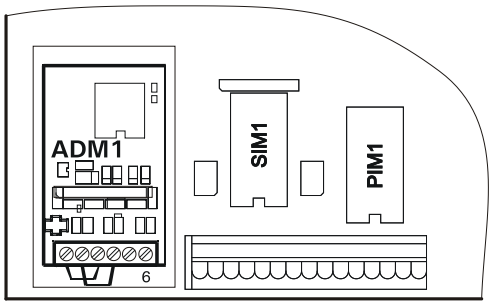
Terminal Assignment	
1	+Excitation
2	– Excitation
3	+Sense
4	– Sense
5	+Signal
6	– Signal



Connection of 4-wire analog load cell(s) to the ADM module:

To connect load cells without sense lines (4-wire connection), two jump leads must be connected at terminal strip KL1 between terminal 1 and 3, and between terminal 2 and 4.

Terminal Assignment	
1	+Excitation
2	– Excitation
3	Jump lead to +Excitation
4	Jump lead to – Excitation
5	+Signal
6	– Signal



3.5.2 Connection Cables For Analog Load Cells

For the installation of connection cables for analog weighing platforms please follow the recommendations listed below:

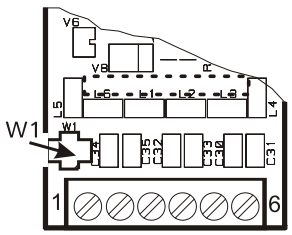
- Only use suitable load cell cable:
  (e.g. SysTec order No. 10KAB214, 3 x 2 x 0.75 mm², shielded, max. 200 m)
  - Nominal voltage of cable ≥ 250 V
  - Shielded cable (shielding braid)
  - Length and cross section of the individual wires must comply with the following condition:
    Cable length (m) / cross section (mm²) ≤ 270 (m/mm²)
  - Maximum length of connection cable between weighing platform and weighing terminal: 200 m

    When twisted-pair cables are used, pairs of wires must be combined as follows:
    Wire pair 1: +/–Excitation
    Wire pair 2: +/–Sense
    Wire pair 3: +/–Signal

    Unsuitable load cell cables may affect accuracy.
- The shield of the load cell cable must be connected all around the cable in the cable gland of the weighing terminal (see also chapter 'Installation' / 'Connection Of Cables'). Load cells and/or weighing platforms, junction boxes and the terminal must be included in the potential equalization of the components of a weighing system. Depending on the situation on site this may require the installation of a separate earth lead of appropriate diameter (e.g. 16 mm²) in parallel to the load cell cable.
- For extension of the load cell cable only use metal junction boxes and connect shield of both cables inside the cable glands.
- Distance between load cell cables and power lines: ≥0.5 m. Install load cell cables in grounded metal conduits, metal hoses or metal cable trays.
- If tension load is applied to load cells instead of compression load, connection for +Signal and –Signal must be transposed.

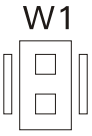
3.5.3 Securing Scale Parameters

The scale parameters are stored in EEPROM and secured with the jumper W1:



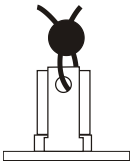
Calibration data secured

Calibration and storing released



W&M approved applications require that the calibration parameters be protected against unauthorized

modifications. To that effect, the jumper can be sealed with thread and lead seal or adhesive label.



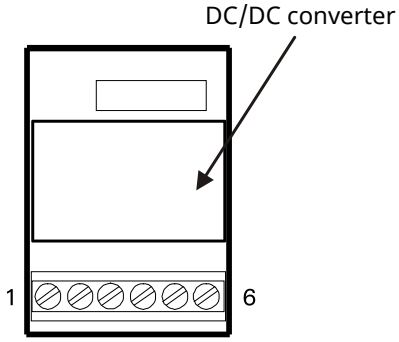
For the description of the calibration procedure, refer to
Calibration Manual IT1/IT3 ADM/DADM, order No. ST.2309.1771

3.5.4 Connection Of Digital Mettler-Toledo Scale Bases With IDNet Interface

The IDN module (IDNet interface module) permits the connection of Mettler-Toledo scale bases with IDNet interface.

The IDN module supplies a current of 150 mA max. at 12 V DC for the supply of the IDNet scale base.

IDN interface module



Terminal strip KL1
Interface for scale base

Terminal KL1	Signal	Function
1	TxD—	— transmit line 20 mA CL
2	TxD+	+ transmit line 20 mA CL
3	RxD—	— receive line 20 mA CL
4	RxD+	+ receive line 20 mA CL
5	0 V	0 V supply voltage
6	+12 V (150 mA)	+12 V supply voltage

The following connection values must also be observed:

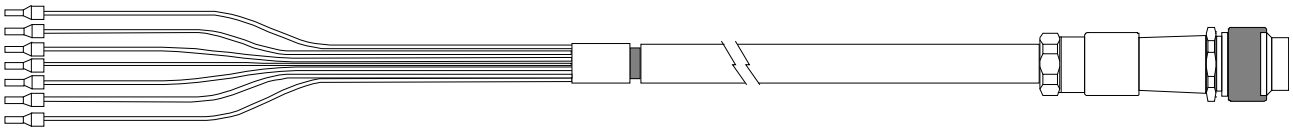
Cross section (rigid wires):	0.14–1.5 mm^2
Cross section (flexible wire with insulated wire end ferrule):	0.25–1.5 mm^2
Length of stripped insulation:	6 mm
Torque:	0.5–0.6 Nm

IDNet understructures which operate on 12 V DC power supply (e.g. TBrick) are connected with the IDNet scale cable 16KAB002.

For IDNet scale bases with 12 V and 32 V power supply (e.g. K-Cell), the external power supply unit IDNet-PSBox (10OPT124) is required. The connection is made with the IDNet scale cable 16KAB004.

Standard cable for the connection of digital weighing platforms (approx. 0.3 m):

IDNet connecting cable for Mettler-Toledo scale bases
Art. No. 16KAB002 / 16KAB004 (ST.2300.0064)



Terminal Strip KL1	Color	Signal	Pin Assignment (12-pin Binder Connector)
1	yellow	TxD–	J
2	green	TxD+	A
3	white	RxD–	F
4	brown	RxD+	D
5	pink	0 V	H
6	gray	+12 V	C
	blue	+ 32 V	B

Note:

The blue wire of cable 16KAB002 (for IDNet scale bases with 12 V supply) is not used and must be cut directly at the cable gland.

The pink and blue wires of cable 16KAB004 (for IDNet scale bases with 12 V and 32 V supply) are fitted with crimp contacts for connection to the IDNet-PSBox.

For the description of the calibration procedure, refer to
Calibration Manual IT1/IT3 IDNet MultiRange, order No. ST.2309.1776

3.5.5 Interface For Digital Load cells With RS485 Interface (DWB/DWB-Keli)

The DWB module (Digital Weighing Board) permits the connection of one digital force transducer operating on 12 V DC power supply and communicating with the weighing terminal via RS485 2-wire or 4-wire network.

At present, scale bases and load cells are supported as follows:

- Minebea Intec series IS weighing platforms
- HBM series C16i load cells
- Flintec series RC3D load cells
- SCAIME-series CB50X-DL load cells

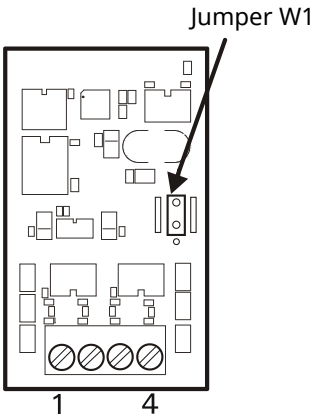
The module 'DWB-Keli' enables to connect digital load cells of the manufacturer Keli Sensing Technology of type ZSF-D and ZSW-D.

Calibration data are stored power-fail-safe in a serial EEPROM on the DWB module. By means of the jumper W1 these data can be protected against unauthorized access.

At terminal strip KL1 of the CPU board, 12 V power supply is available for digital load cells.

W A R N I N G
For max. permissible current drain see chapter 'Power supply of external units'!

DWB interface module



Terminal strip KL1
interface for digital scale base

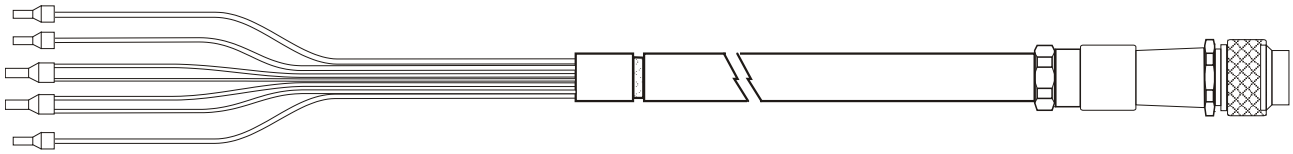
Terminal KL1	Signal RS485 4-wire	Signal RS485 2-wire	Assignment
1	Tx A (Tx+)	A (Tx+ / Rx+)	+ transmit line RS485
2	Tx B (Tx—)	B (Tx— / Rx—)	— transmit line RS485
3	Rx A (Rx+)	—	+ receive line RS485
4	Rx B (Rx—)	—	— receive line RS485

The following connection values must also be observed:

Cross section (rigid wires):	0.14–1.5 mm^2
Cross section (flexible wire with insulated wire end ferrule):	0.25–1.5 mm^2
Length of stripped insulation:	6 mm
Torque:	0.5–0.6 Nm

For the connection of digital Minebea Intec platforms, adapter cables are available with a length of 0.3 m (art. No. 16KAB001) or 2 m (art. No. 16KAB005).

RS485 2-wire connecting cable for Minebea Intec weighing platforms



Terminal KL1 (DWB)	Color	Signal	Pin assignment (12-pin Binder connector)
1	green	Tx+ / Rx+	L
2	yellow	Tx– / Rx–	A
–	blue *)	PROG	F

Terminal KL1 (CPU1)	Color	Signal	Pin assignment (12-pin Binder connector)
1	brown / white	0 V	K + J + E
2	gray / pink	+12 V	G + M

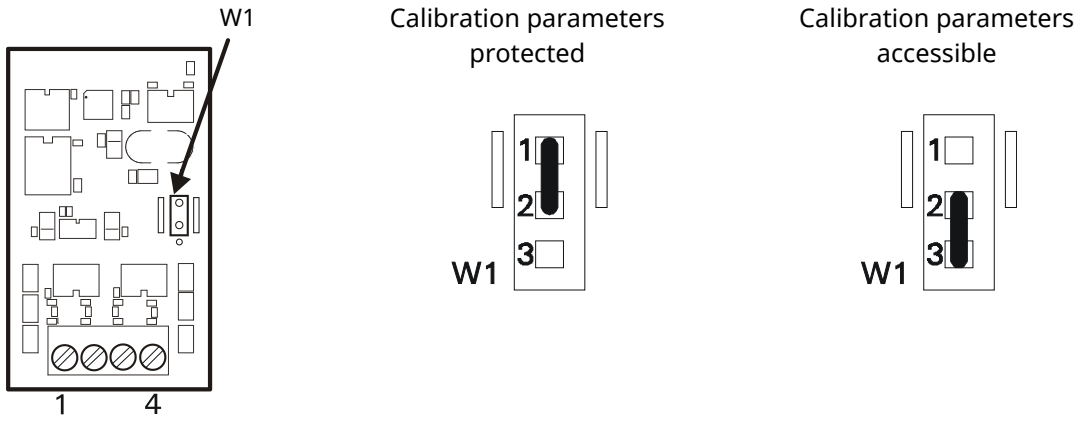
*) Note: The blue wire (PROG) is not used and should be cut directly at the cable gland.

For the description of the calibration procedure, refer to:

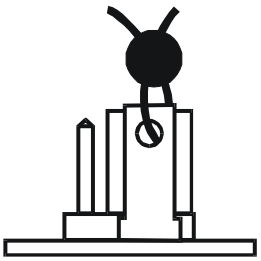
- Calibration Manual IT1/IT3 Digital Scale Connection, order No. ST.2309.1781
- Calibration Manual IT1/IT3 Minebea Intec IS, order No. ST.2309.1891

3.5.6 Sealing Of Calibration Parameters

By means of the jumper W1 the calibration parameters stored in DWB can be protected against unauthorized modifications:



If required for W&M approved and stamped systems, the position of the jumper W1 can be sealed with thread and lead seal or with a paper seal:



3.5.7 Connection Cables For Digital Load Cells

Unsuitable cable may cause loss of data. For the installation of connection cables for **digital** weighing platforms please follow the recommendations listed below:

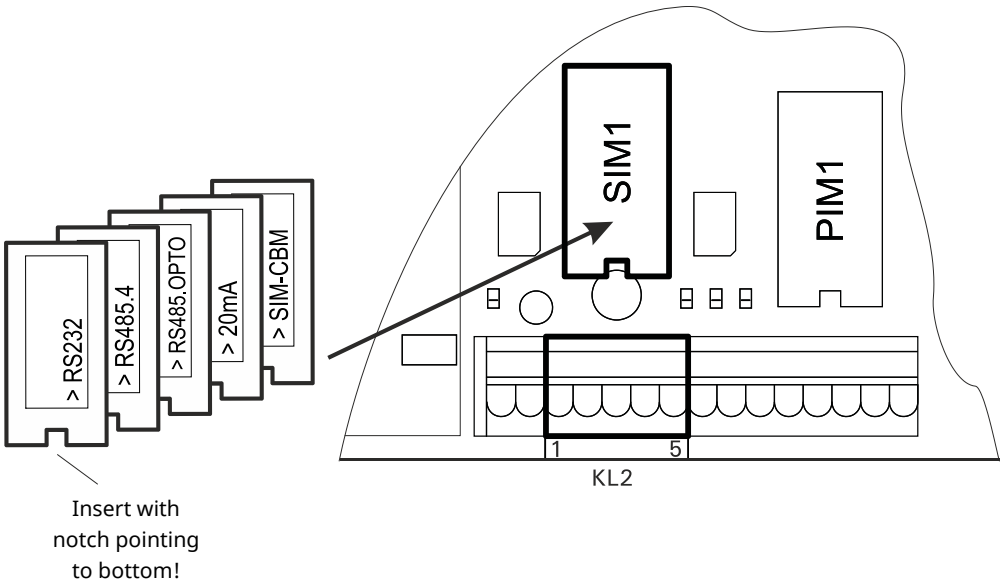
- Only use suitable connecting cables (data cables), e.g. 6 x 0.25 mm² shielded, SysTec order No. 10KAB216, or data cables supplied by the manufacturer of the scale base.
- Nominal voltage of cable ≥ 250 V.
- Connect shield of cable at **both sides,** at cable gland of terminal and at scale base and/or extension cable. Install appropriate equipotential bonding if difference of potential is experienced.
- Distance between data cables and power lines: ≥ 0.5 m. Install data cables in grounded metal conduits, metal hoses or metal cable trays.
- Maximum cable length depends on:
  - Cable cross section
  - Supply voltage
- Type and number of connected load cells

3.6 Connection Of Serial Interfaces SIM And SIM-CBM

The following plug-on modules for the connection of a serial interface or an incline sensor can be inserted in the SIM sockets:

- 'SIM RS232' as RS232 interface
- 'SIM 20mA' as 20 mA current loop interface (passive)
- 'SIM RS485.4' as RS485 4-wire interface (point-to-point only)
- 'SIM RS485.OPTO' as opto-isolated RS485 4-wire interface (point-to-point only)
- 'SIM-CBM' to connect CANopen incline sensor

Connection of serial interface on the main module:

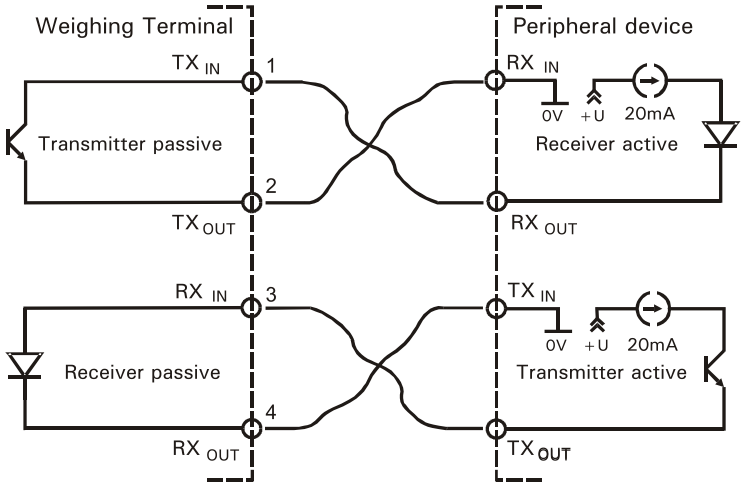


Terminal assignment KL2 Serial interface			
Terminal KL2	**RS232**	**20 mA**	**RS485 4-wire/OPTO**
1	TxD	TX_{IN}	Tx A (Tx+)
2	RTS	TX_{OUT}	Tx B (Tx—)
3	RxD	RX_{IN}	Rx A (Rx+)
4	CTS	RX_{OUT}	Rx B (Rx—)
5	Gnd	—	—

The following connection values must also be observed for all SIM modules:

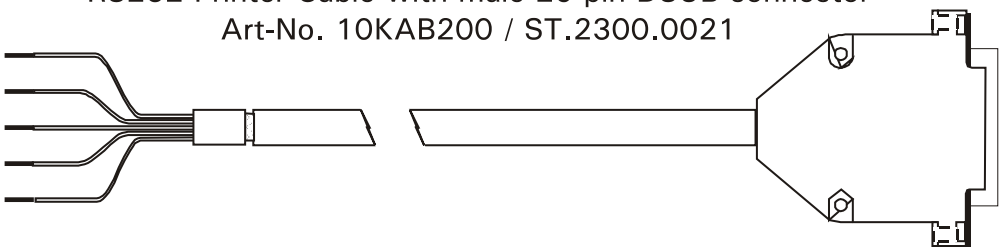
Type of connection:	Spring-based push-in connection
Cross section (rigid wires):	0.2–1.5 mm^2
Cross section (flexible wire with insulated wire end ferrule):	0.25–0.5 mm^2
Length of stripped insulation:	9 mm

3.6.1 Principal Circuit Diagram Of The 20 mA Current Loop Interface



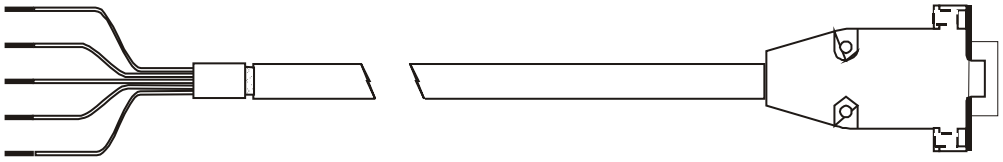
3.6.2 Standard Cables For Serial Interface

RS232 Printer Cable with male 25-pin DSUB-connector
Art-No. 10KAB200 / ST.2300.0021



Terminal			Printer	
TxD	1	green	3	RxD
RTS	2	yellow	5	CTS
RxD	3	brown	2	TxD
CTS	4	white	20	DTR
Gnd	5	gray	7	Gnd

RS232 Data Cable with female 9-pin DSUB-connector
Art-No. 10KAB202 / ST.2300.0019



Terminal			PC	
TxD	1	green	2	RxD
RTS	2	yellow	8	CTS
RxD	3	brown	3	TxD
CTS	4	white	7	RTS
Gnd	5	gray	5	Gnd
			1	
			4	
			6	

approx. 3m

For the installation of connection cables for serial interfaces please follow the recommendations listed below:

- Install data cables to prevent capacitive or inductive interference from other cables, machines and/or electrical devices that could interrupt data transmission and may lead to delays or stop of program.
- Non-factory made cables must comply with the following specification:

Triple twisted pair plus shield, e.g. LIYCY 3 x 2 x 0.25 mm², flexible wires with wire end ferrules and plastic collar, shield grounded on both sides.	
Resistance	≤ 125 Ω/km
Gauge	0.25 mm^2 up to max. 0.5 mm^2
Capacitance	≤ 130 nF/km
Length RS232	max. 15 m
Length 20 mA	max. 1000 m (for baud rate 4800), max. 500 m (for baud rate 9600)
Length RS485	max. 1200 m
Impedance RS485	approx. 150 Ω
Nominal voltage	≥ 250 V

3.7 Connection of CANopen incline sensor to SIM-CBM

The plug-on module SIM-CBM provides connection for a CANopen incline sensor.

The SIM-CBM can be installed on socket SIM1.

Power supply for the sensor is provided via terminal strips KL1 (terminal 1, 2) and KL3 (terminal 1, 2), see chapter 'Auxiliary Power Supply for Peripheral Devices'. Further information regarding the configuration if the incline sensor can be found in the relevant calibration manual.

Notes:

- Only inclination sensors of the series 'TILTIX ACS' by 'Posital Fraba' are supported.
- The specifications in the incline sensor manual must be observed.
- The configuration of the sensor must not deviate from the factory settings. The diode 'Node-ID 1' must be assigned to the incline sensor (factory setting of the sensor). If the Node-ID deviates from the factory setting, it must be reset with an appropriate CANopen-Master.
- The use of a shielded cable with a maximum length of 10 m is recommended.
- Only one incline sensor and no further CAN participant must be connected to the SIM-CBM.
- Supported baud rates: 50, 100, 125 k baud (typ.). The SIM-CBM automatically sets itself to the baud rate configured in the incline sensor.
- The CAN bus is permanently terminated on the SIM-CBM with 120 Ω.

Connection of CANopen incline sensor (SIM-CBM)

CPU1 terminal KL2	Designation
1	–
2	CAN Low
3	CAN Ground
4	CAN High
5	–

Status LED:

Proper or faulty operation is indicated by a green LED on the circuit board upside.

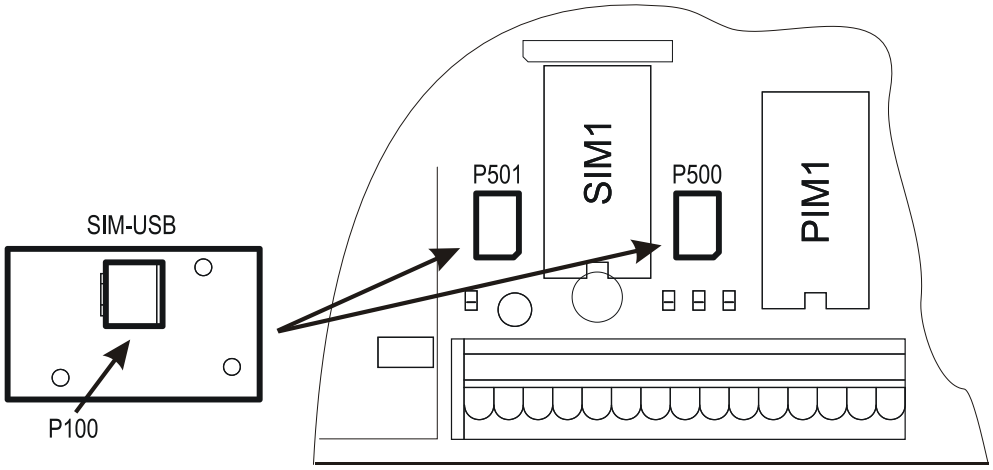
LED	Description
On	Connected to incline sensor. Data transmission of measured values in progress.
Flashing twice, followed by 1 s pause	Failure to connect to the incline sensor • Incline sensor not in factory default • Incline sensor power supply not connected • Faulty bus wiring • Further participants connected to the CAN bus • Sensor defective
Flashing cyclic	Self-test of SIM-CBM failed. Possible hardware defect of SIM-CBM.
Off	Hardware defect

3.8 USB Connection

Insert USB module SIM-USB in socket P500/P501.

Note:

The maximal current output of the SIM-USB depends on the chosen scale interface (see chapter 'Power Supply Of External Units').



Connection to external USB devices is made with one of the following options:

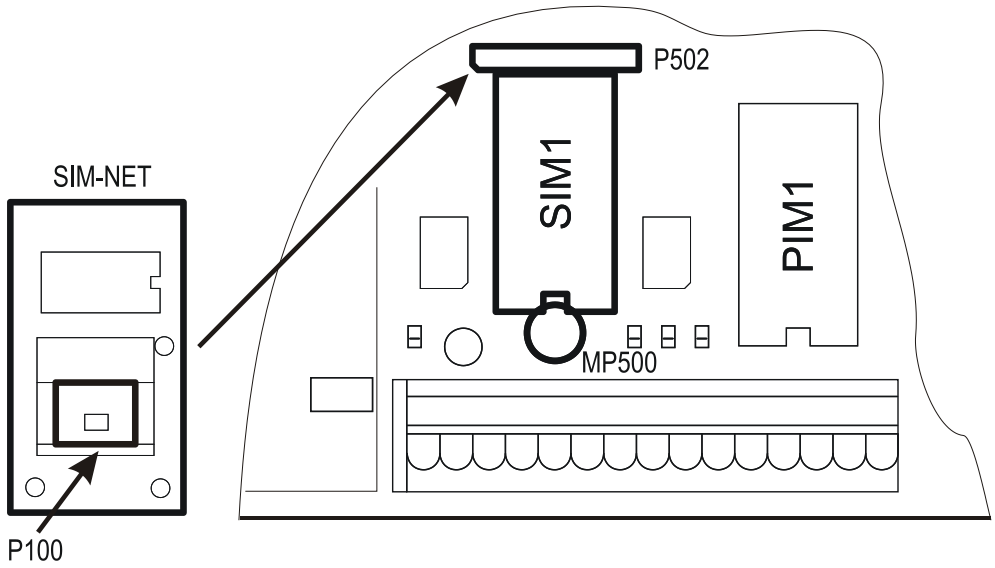
- ITXOPT252: SIM-USB with USB socket type A at the bottom,
- ITXOPT253: SIM-USB with short connection cable with USB socket type A.

Certain parts of the program can only be accessed with a connected USB keyboard. These steps are marked in the manual where applicable.

The key assignment corresponds to the terminal keyboard when a USB keyboard is used.

3.9 Ethernet Connection

Insert Ethernet module SIM-NET (ITXOPT250) in socket P502 and fix with screw at MP500. The connection to Ethernet networks is made at the M12 socket located at the bottom of the housing.



The SIM-NET module is available with two different options for connection:

- ITXOPT250: SIM-NET with M12 socket (D-coding) for installation on bottom of housing
- ITXOPT251: SIM-NET with RJ45 socket for installation on bottom of housing

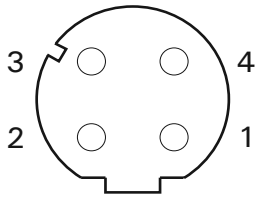
Connection to local 10/100 MBit Ethernet networks is made with one of the following connecting cables:

- ITXKAB001: Ethernet connecting cable M12 connector (D-coding), angled, to RJ45 connector (5 m)
- ITXKAB002: Ethernet connecting cable M12 connector (D-coding), angled, to RJ45 connector (10 m)
- ITXKAB003: Ethernet connecting cable M12 connector (D-coding)), straight, to RJ45 connector (5 m)
- ITXKAB004: Ethernet connecting cable M12 connector (D-coding), straight, to RJ45 connector (10 m)

Note: Max. permissible cable length without repeater (hub/switch) is 80 m.

Assignment of the Ethernet M12 socket (D-coding)

Pin	Designation
1	TD+
2	RD+
3	TD−
4	RD−



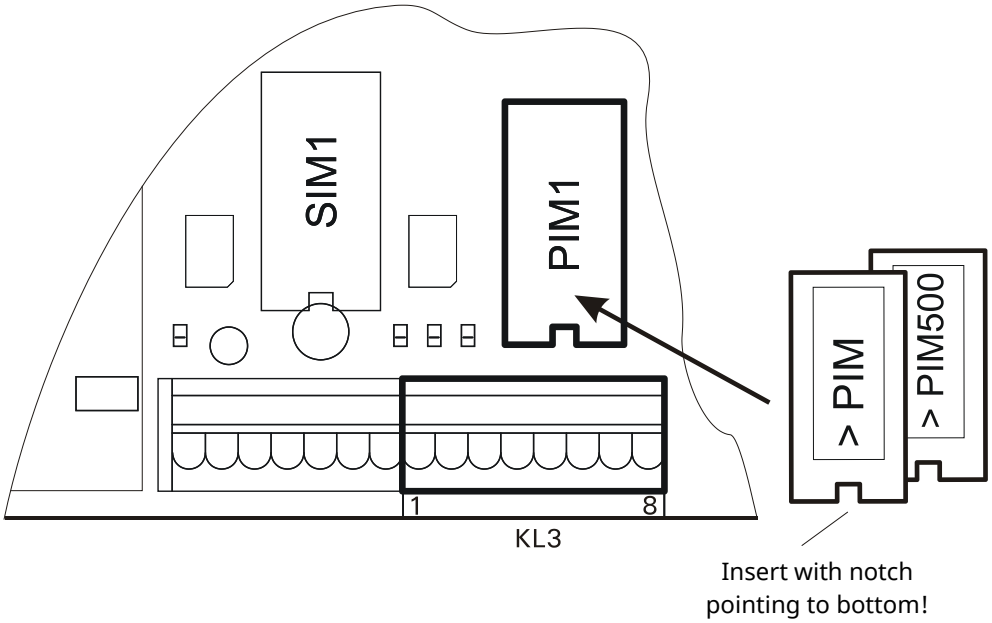
3.10 Connection Of Digital I/Os PIM/PIM500

The digital input/outputs on the mainboard can be activated by inserting plug-on modules (PIM). Each module provides drivers for two opto-isolated inputs and two opto-isolated outputs.

CAUTION:

- **Rating of outputs**:
  PIM: max. 100 mA at 12–24 V DC.
  PIM500: max. 500 mA at 12–24 V DC.
  Current consumption of inputs:
  PIM/PIM500: max. 7 mA at 12–24 V DC.

Connection of digital inputs/outputs PIM on mainboard CPU1:



Terminal assignment KL3 Digital inputs and outputs		
1	O V	
2	+12 V	
3	IN0	
4	IN1	
5	IN–	PIM: for IN0–IN1 PIM500: for IN0–IN1 and OUT0–OUT1
6	OUT0	
7	OUT1	
8	OUT+	PIM and PIM500: for OUT0–OUT1

The following connection values must also be observed for all PIM modules:

Type of connection:	Spring-based push-in connection
Cross section (rigid wires):	0.2–1.5 mm^2
Cross section (flexible wire with insulated wire end ferrule):	0.25–0.5 mm^2
Length of stripped insulation:	9 mm

W A R N I N G
For max. permissible current drain at KL3 (terminal 1 and 2) see chapter 'Power supply of external units'!

For the installation of connection signal cables please note:

Install I/O cables to prevent capacitive or inductive interference from other cables, machines and/or electrical devices that could affect input/output signals and lead to malfunction and/or dangerous operational conditions.

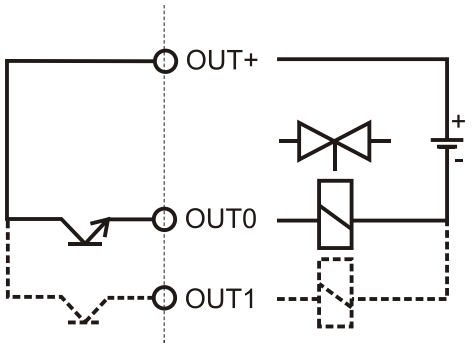
Cables must comply with the following specification:

Shielded multicore cables, shield connected to ground on both sides. Flexible wires with wire end ferrules.	
Resistance	≤ 125 Ω/km
Gauge	0.25 mm^2 up to max. 0.5 mm^2
Capacitance	≤ 130 nF/km
Nominal voltage	≥ 250 V
Length	with internal power supply: max. 15 m with external power supply: max. 100 m

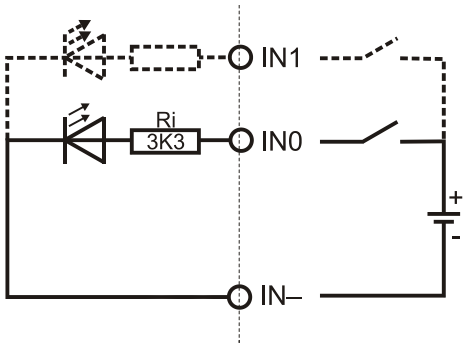
Notes:

- For maximum suppression of interference, shield should be grounded on both sides.
- If fluctuation of the earth potential is experienced, this can cause an equalization current flowing over the shield. In this case, a separate earth lead of appropriate diameter for potential equalization is required.

Principal schematics PIM:

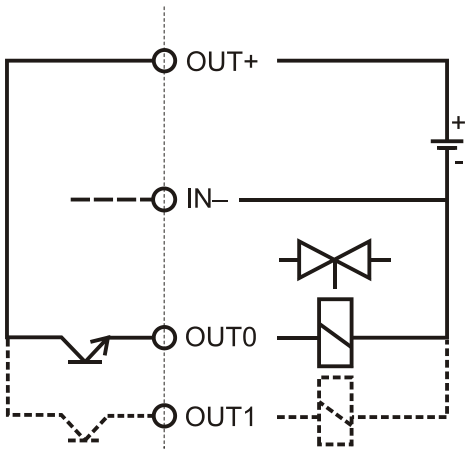


Digital output

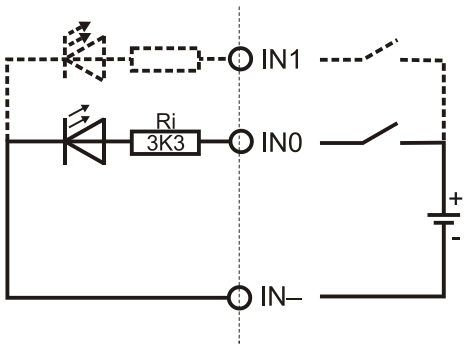


Digital input

Principal schematics PIM500:



Digital output



Digital input

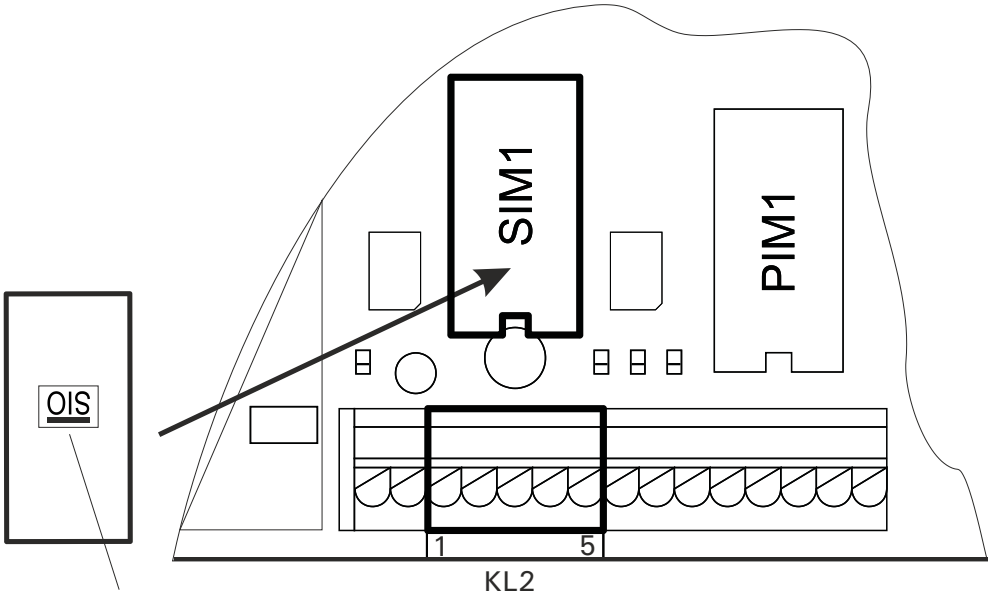
3.11 Connection Of Digital I/Os SIO

As an alternative or additional to the PIM/PIM500 modules the serial I/O module SIO can be used. It is inserted in socket SIM1 and provides one opto-isolated input and two opto-isolated outputs.

Rating of outputs: max. 100 mA at 12–24 V DC.

Current consumption of input: max. 7 mA at 12–24 V DC

Connection of digital inputs/outputs SIO



Insert with marker (black horizontal bar) pointing to bottom!

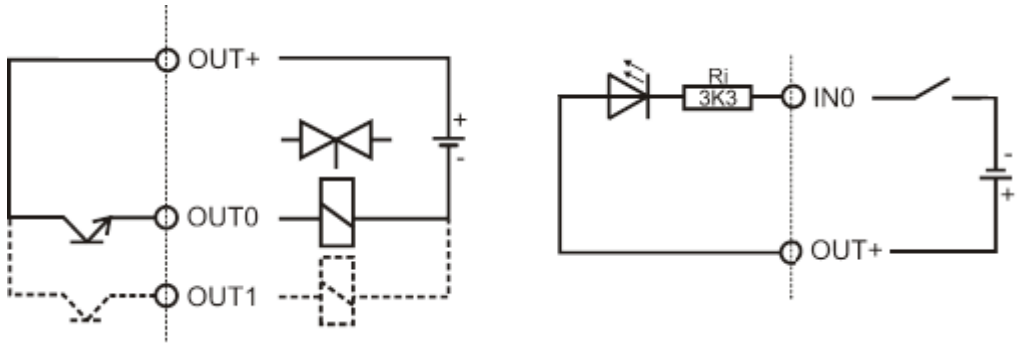
KL2 (SIM1): Digital inputs and outputs 0–1		
1	OUT0	
2	OUT1	
3	OUT+	for OUT0–OUT1 and IN0
4	IN0	
5	–	Must remain free!

The following connection values must also be observed:

Type of connection:	Spring-based push-in connection
Cross section (rigid wires):	0.2–1.5 mm^2
Cross section (flexible wire with insulated wire end ferrule):	0.25–0.5 mm^2
Length of stripped insulation:	9 mm

W A R N I N G
In contrast to the digital inputs of the PIM/PIM500 modules, the input of the serial SIO module is inverted! I.e. a high signal (logic state 1) is detected when the input is connected to ground potential. See principal schematic below!

Principal schematics SIO



Digital output Digital input

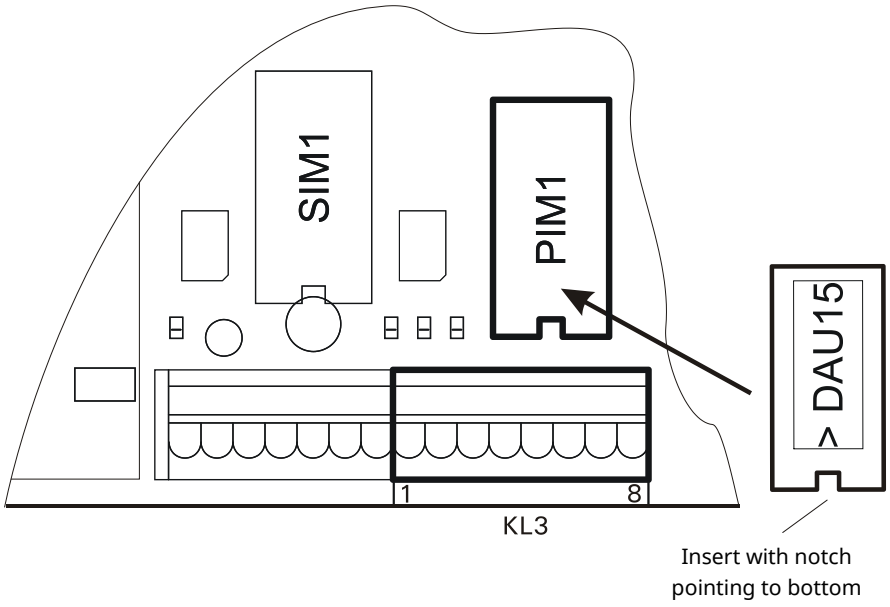
3.12 Connection Of 15-Bit Analog Output DAU15

For the output of gross or net weight as analog 15-bit signal a plug-on module (DAU15) can be installed in the socket PIM1. The module can be configured in 'Config./Analog Out' of the Service Mode to 0/2–10 V or 0/4–20 mA. The output signal has a resolution of 15 bit (32768 steps). The output of the DAU15 module is active and potential free.

Digital I/Os with PIM module and analog output are not possible at the same time.

W A R N I N G
The analog voltage output (U) is <u>not</u> short-circuit proof!

Inserting the DAU15 into a PIM socket of the mainboard

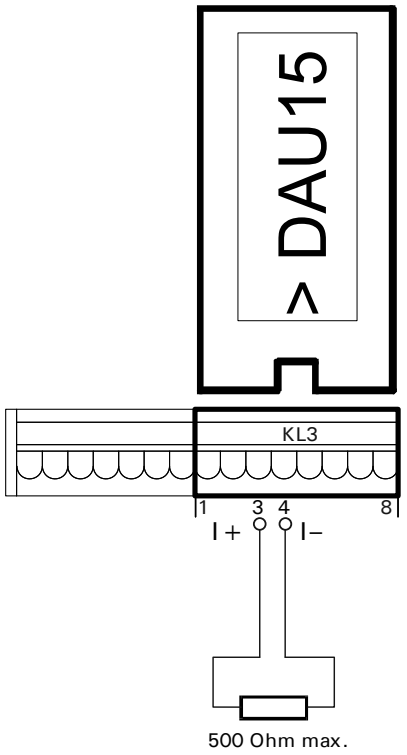


Terminal assignment KL3 Analog output DAU15		
1		
2		
3	I+	+ Current output 0/4–20 mA
4	I–	— Current output 0/4–20 mA
5		
6	U+	+ Voltage output 0/2–10 V
7	U–	— Voltage output 0/2–10 V
8		

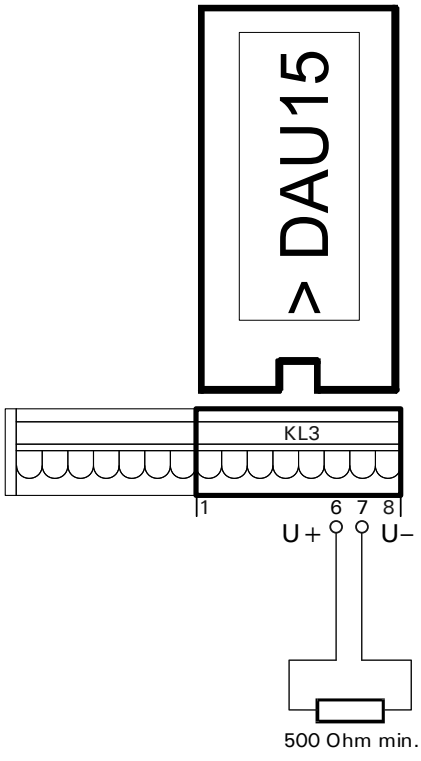
The following connection values must also be observed:

Type of connection:	Spring-based push-in connection
Cross section (rigid wires):	0.2–1.5 mm²
Cross section (flexible wire with insulated wire end ferrule):	0.25–0.5 mm²
Length of stripped insulation:	9 mm

Example for current output 0/4–20 mA:



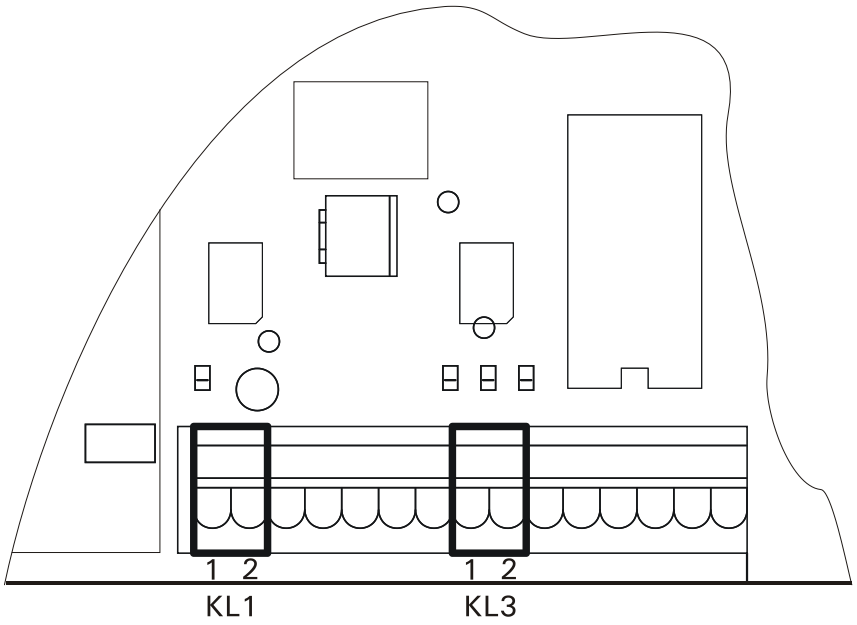
Example for voltage output 0/2–10 V:



3.13 Power Supply Of External Units

12 V power supply for peripheral devices (e.g. digital load cells) is available at terminal strips KL1 (terminal 1, 2) and KL3 (terminal 1, 2).

Terminals for power supply



Terminal	1	2
KL1	0 V	+12 V
KL3	0 V	+12 V

The following connection values must also be observed:

Type of connection:	Spring-based push-in connection
Cross section (rigid wires):	0.2–1.5 mm^2
Cross section (flexible wire with insulated wire end ferrule):	0.25–0.5 mm^2
Length of stripped insulation:	9 mm

Max. permissible current drain:

ADM installed in socket ADM1
(with up to 8 analog load cells, 350 Ohm each):

Current drain USB participant	Current drain for peripheral devices (12 V) at terminal KL1 and KL3 (in total)
0–100 mA	300 mA max.
100–300 mA	200 mA max.
300–500 mA	100 mA max.

IDN installed in socket ADM1
(Power supply of IDNet scale base via IDN module (screw terminal 5, 6):

Current drain USB participant	Current drain for peripheral devices (12 V) at terminal KL1 and KL3 (in total)
0–100 mA	300 mA max.
100–300 mA	200 mA max.
300–500 mA	100 mA max.

DWB/DWB-Keli installed in socket ADM1
(Power supply of digital load cells via KL1 (screw terminal 1, 2) on CPU:

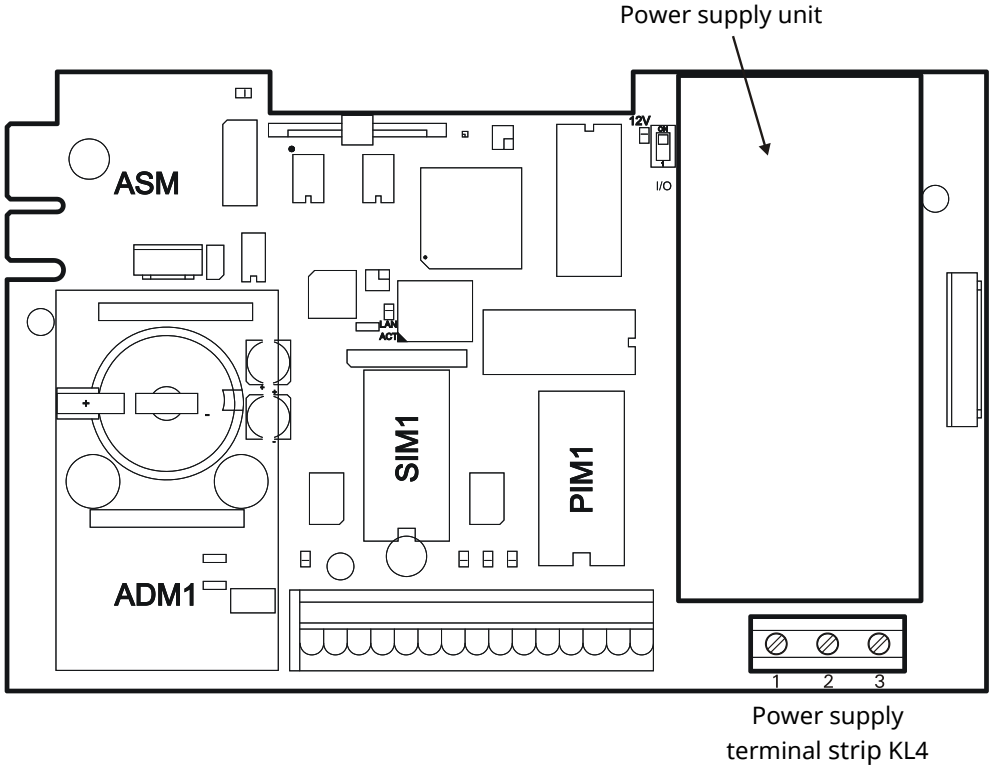
Current drain USB participant	Current drain for digital load cells and peripheral devices (12 V) at terminal KL1 and KL3 (in total)
0–100 mA	400 mA max.
100–300 mA	300 mA max.
300–500 mA	200 mA max.

W A R N I N G
In order to avoid overheating of the device, the max. current drain stated above must absolutely be adhered to!

3.14 Connection To Mains Supply

W A R N I N G
Danger to life! Before connecting the unit to the mains supply read safety instructions in chapter 'General Safety Advice'!

- IT1 is available in three versions, for connection to AC supply (IT1-AC), DC supply (IT1-DC) and for supply through external batteries (IT1-BATT).
- Install mains supply for the device separately from supply for machines and equipment generating noise and/or interference (motors, relays, heaters, etc.). Even short spikes and/or drop-outs may affect the correct function of the device and result in defects. If problems of that nature are encountered, the installation of a voltage stabilizer or an uninterruptible power supply unit (UPS) may help to overcome the difficulties.
- The unit must be included in the potential equalization of the installation. For the connection a threaded bolt is provided at the rear of the housing.



The following connection values must also be observed (AC / DC / BATT):

Cross section (rigid wires):	0.75–1.5 mm^2
Cross section (flexible wire with insulated wire end ferrule):	0.75–1.5 mm^2
Length of stripped insulation:	6 mm
Torque:	0.5–0.6 Nm

3.15 Connection To 110–240 V AC (IT1-AC)

IT1-AC has a power supply unit for AC voltages ranging from 110 V (–15 %) to 240 V (+10 %), 50/60 Hz. It has a fused input (2 A slow blow). Ex factory, mains connection is made via a line cord with safety plug (2.5 m length) connected at terminal strip KL4.

KL4 Terminal assignment	
1	PE
2	N
3	L1

W A R N I N G
Parts of the power supply unit are directly connected to dangerously high voltages!
A defective power supply unit cannot be repaired, i.e. CPU1 together with the power supply unit must be replaced. Disconnect all power to the device before servicing!

3.16 Connection To 12–24 V DC (IT1-DC)

IT1-DC has a power supply unit (DCB) for DC voltages ranging from 12 V DC (–15 %) to 24 V DC (+25 %). Connection is made at terminal strip KL4.

KL4 Terminal assignment	
1	PA
2	0 V
3	+V

3.17 Connection To External Battery 12–24 V DC (IT1-BATT)

IT1-BATT has a power supply unit (NTB) for DC voltages ranging from 12 V DC (–15 %) to 24 V DC (+25 %). The unit is suitable for connection to an external battery. It features voltage monitoring with automatic shutoff. The external battery is connected at terminal strip KL4.

KL4 Terminal assignment	
1	PA
2	0 V
3	+V

When the IT1-BATT unit is supplied from an external battery, the respective type must be chosen under '\Service\General\Power supply,' this choice affects the automatic power off switching when battery is low:

Parameter	Type	Low batt. (Volt) (Battery symbol lights up at approx.)	Power off (Volt) (Switching off at approx.)
Pb12	12 V lead battery	11.5 V	11 V
Pb24	24 V lead battery	23 V	22 V
Adjust	not specified	configurable	configurable
Line	mains operation	—	—

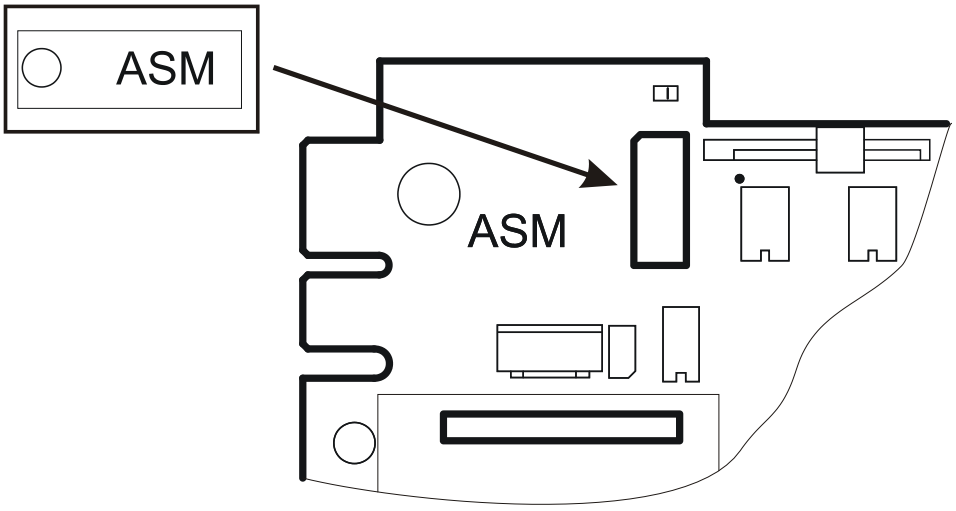
A flashing battery symbol at the upper right edge of the display indicates 'battery low' and the need to recharge the battery.

To avoid deep discharge, the terminal is switched off automatically when the preset voltage is reached (Power off). If the operator tries to switch it on again, the message ' Low Battery: Power off' appears and the terminal is switched off again.

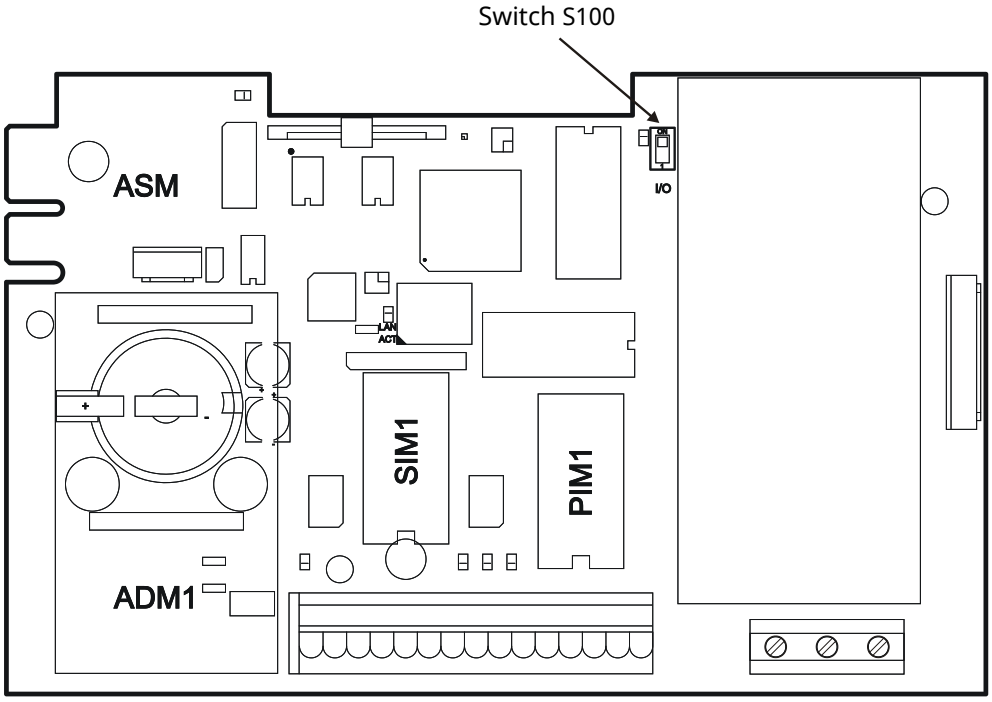
3.18 Connection Of Weight Storage Module ASM

The ASM weight storage module (data archive) is inserted in the ASM socket and secured with a screw. It provides storage capacity for the most recent 1,000,000 weighings.

Position of ASM module in ASM socket



3.19 Enable On/Off Key



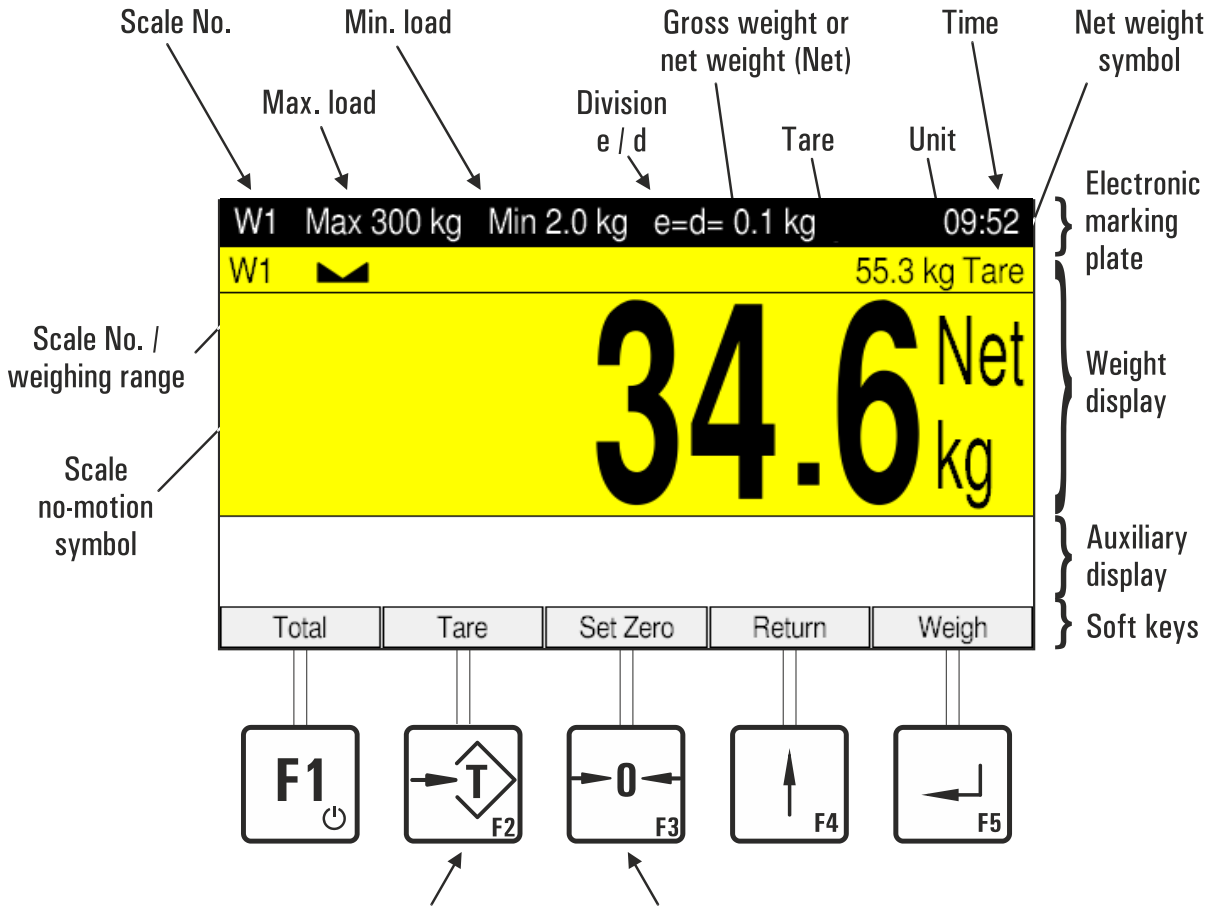
F1

Switch S100 on the main board determines the function of the on/off key:

- Position ON: On/off key disabled.
  When connected to power supply, the weighing terminal starts immediately.
- Position 1: On/off key enabled.
  The weighing terminal starts only after pressing the on/off key. Holding the key for approx. 6 seconds switches the terminal off.

Note: The switch S100 must be in position 1 when 'General\Power Off' ≠ 0 is configured in Service Mode.

4 Weight Display And Scale Function Keys



Tare Key
for taring of currently displayed weight or clearing the tare weight.
(Function can be disabled in application program)

Set Zero Key
to set the displayed scale to zero (only within zero setting range, selectable in calibration mode).
(Function can be disabled in application program)

Electronic Marking Plate (not for three-range scales)

Note: The electronic marking plate is blanked when parameter 'Service Mode\Calibration\Adaptation\Onscreen typeplate=N' is set, it is also blanked for certain types of scale platforms.

Scale No.	W1	Always 1
Max Load	e.g.: Max 3000 kg	Maximum load (without additive tare), selectable in calibration mode
Min Load	e.g.: Min 20 kg	Permissible minimum load
Division e / d	e.g.: e=d=1 kg	Approved division e and display graduation d (in most cases e = d)
09:52		Display of time

Weight Display

Scale No. / **No. Of Weighing Range**	W1 W1.1 ... W1.3	Always 1 Partial weighing range for multiple-range scales
No-Motion Symbol		Settled weight (printing / storing possible).
Zero Symbol	**>0<**	Scale in gross zero range (±0.2 d)
Tare	**55.3 kg T**	Display of tare weight
Gross Weight Or Net Weight	e.g. 1250 e.g. 650 Net	Switching from gross weight to net weight with Tare-key
Net Weight Symbol	Net	Scale is tared.
Unit	e.g. kg	Weight unit, selectable in calibration mode

Confirmation Of Entry / Chosen Function

Every entry or selected function / parameter must be confirmed by pressing the Enter-key (even if not explicitly stated in the text). Subsequently, the program is continued in the next step.

Softkeys

The assignment of softkeys is defined in the respective program step. The currently valid assignment is shown in the lower display line above the function keys.

Key	Function	Comment
	**F1 -key**	On/off (if enabled)
	Select	Scrolling forward
	Service	Call up Service Mode during display of program version
	Clear / Clr	Press once: Delete individual characters Hold down: Delete all entries
	**Taring**	Taring (auto-tare), or clear tare when scale is tared (repetitive tare possible)
	+1 -key	Increase entry by 1 or proceed to next parameter
	Yes	Activate an option
	=>	Scrolling by one character
	Net(X)	Show net weight with tenfold resolution
	**Zero -key**	Set gross weight to zero (only within zero setting range)
	0 -key	Append a zero to the numeric entry
	No / 0	Deactivate an option
	kg / lb / oz / ...	Switch weight unit: • additional loadable update required • not permitted for W&M approved applications in the EC
	**↑ -key**	Return to previous program step
	**↵ -key**	Confirm entry and continue in next program step
	Setup	Call up Supervisor Mode during display of program version

4.1 Operator Prompting

The following sections describe the operating sequence of the weighing terminal with operator prompts and the requested entries.

The contents of the display is shown in a frame on the left hand side:

Password _

Entry of Service Mode password

Prompts or entries that apply only under certain conditions are shown in an extra frame. The condition is shown in bold face in the upper left hand corner of the frame:

Wrong password entry:

Invalid password!

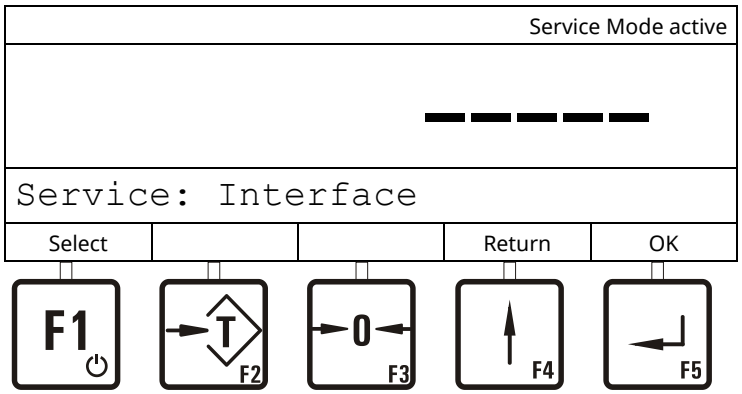
Error message: Invalid Password!

Keys  **and** 

 Confirm entry, continue in next program step

 Back to previous program step

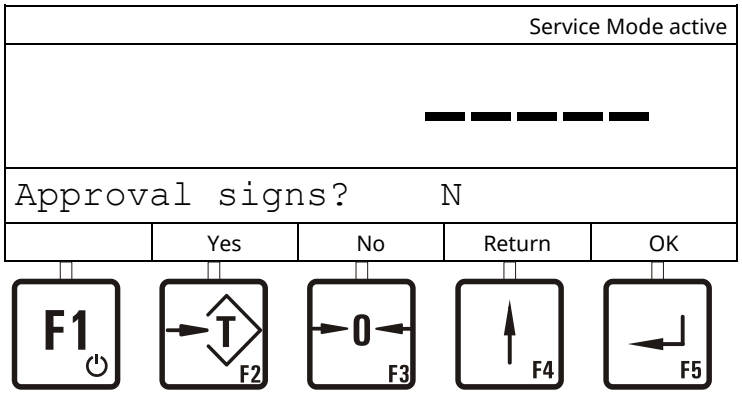
4.2 Choose Options / Menus With Key F1



Example:

Service: Interface	Select F1
Service: General	Select F1
	etc.

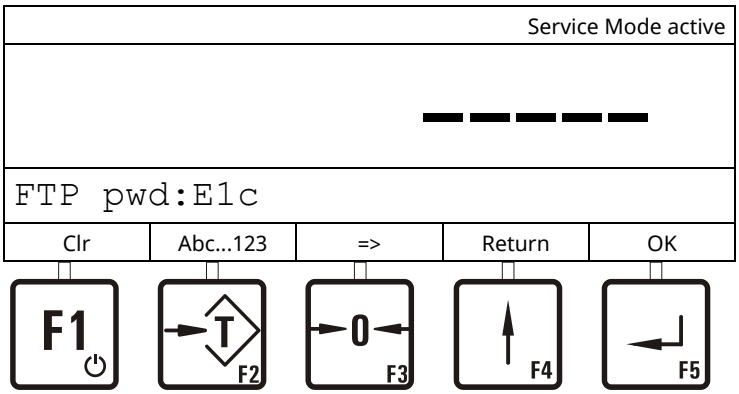
4.3 Yes/No Entries With Keys F2 (T) And F3 (0)



Example:

Approval signs? N	No F3	'N' ('No') is shown, function or parameter is disabled / deselected.
Approval signs? Y	Yes F2	'Y' ('Yes') is shown, function or parameter is enabled / selected.
Approval signs? Y	OK F5	Confirm choice.

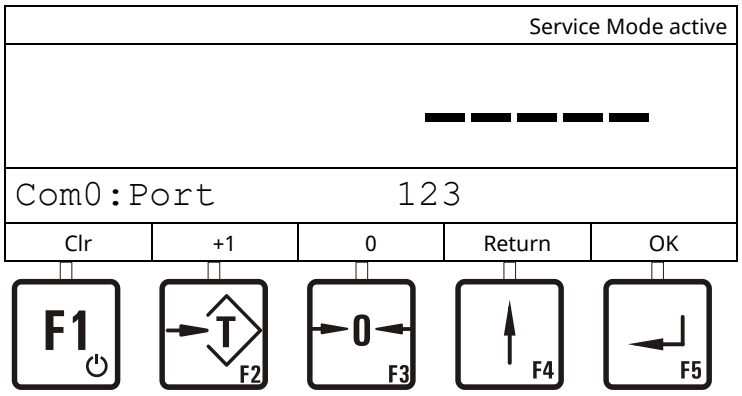
4.4 Alphanumeric Entry



Example: E1c:

FTP pwd:		
FTP pwd:	Clr 	Delete.
FTP pwd:A_	=> 	Press to create a new position for an entry.
FTP pwd:A	Abc...123 	Hold down to select entry mode. The display changes continuously between: A=Upper case characters a= Lower case characters 0=Numbers and special characters
FTP pwd:E	Abc...123 	Press repeatedly until the desired character appears, e.g.: E.
FTP pwd:E_	=> 	Press to create a new position for an entry.
FTP pwd:E0	Abc...123 	Hold down to select entry mode.
FTP pwd:E1	Abc...123 	Press repeatedly until the desired number appears, e.g.: 1.
FTP pwd:E1_	=> 	Press to create a new position for an entry.
FTP pwd:E1a	Abc...123 	Hold down to select entry mode.
FTP pwd:E1c	Abc...123 	Press repeatedly until the desired character appears, e.g.: c.
FTP pwd:E1c	OK 	Confirm entry.

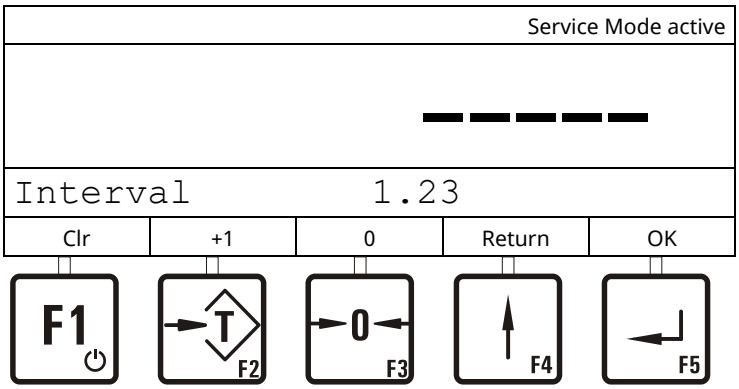
4.5 Entry Of Whole Numbers



Example: 1234:

Com0:Port 123		
Com0:Port	Clr F1	Delete all entries.
Com0:Port 1	+1 F2	Press repeatedly until desired number is shown, e.g. press once = 1.
Com0:Port 10	0 F3	Press to create a new position for an entry.
Com0:Port 12	+1 F2	Press repeatedly until desired number is shown, e.g. press twice = 2.
Com0:Port 120	0 F3	Press to create a new position for an entry.
Com0:Port 123	+1 F2	Press repeatedly until desired number is shown, e.g. press three times = 3.
Com0:Port 123	0 F3	Press to create a new position for an entry.
Com0:Port 1234	+1 F2	Press repeatedly until desired number is shown, e.g. press four times = 4.
Com0:Port 1234	OK F5	Confirm entry.

4.6 Entry Of Numbers With Trailing Decimals



Example: 1.23:

Interval 0.321		
Interval 0	Clr 	Delete all entries.
Interval 1	+1 	Press repeatedly until desired number is shown, e.g. press once = 1.
Interval 10	0 	Press to create a new position for an entry.
Interval 1.	+1 	Press repeatedly until decimal separator appears.
Interval 1.0	0 	Press to create a new position for an entry.
Interval 1.2	+1 	Press repeatedly until desired number is shown, e.g. press once = 2.
Interval 1.20	0 	Press to create a new position for an entry.
Interval 1.23	+1 	Press repeatedly until desired number is shown, e.g. press three times = 3.
Interval 1.23	OK 	Confirm entry.

5 Service Mode

5.1 General

The Service Mode is a program for configuration, calibration and hardware test of the weighing terminal. The following sections give an introduction on how to operate the terminal via keyboard and display and describe the individual functions of the Service Mode.

Notes:

- This weighing terminal and its associated equipment must be installed, adjusted and maintained by qualified personnel only!
- Before accessing the Service Mode all peripheral devices must be installed and configured!
- Access to the Service Mode is protected by the Service Password.
- Inappropriate changes of Service Mode settings may lead to malfunction and errors in the operating sequence!

5.2 Switching On

After switching the unit on the program version, date/time and the chosen operating mode are shown briefly. After that the program branches to the basic step.

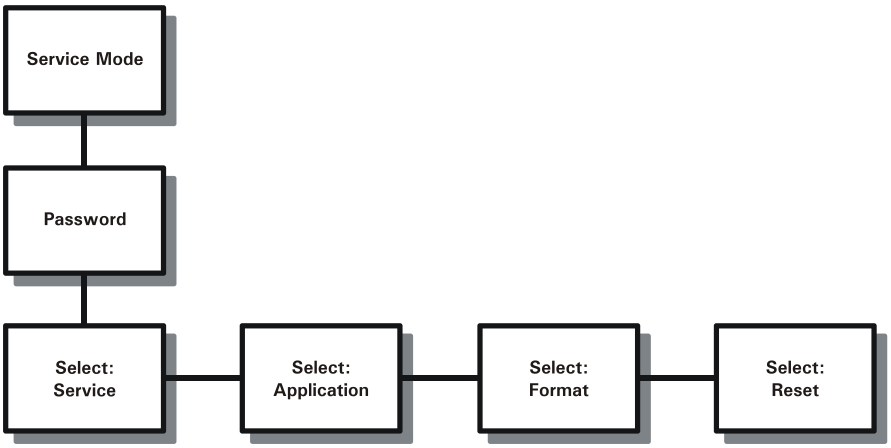
`System Startup...` `Please wait`		Start of weighing terminal after approx. 40 sec.
`IT1 9.99`		Show version, date, time and chosen operating mode.
		Basic step of chosen operating mode
	Return 	From basic step of chosen operating mode switch to display of version message.
`IT1 9.99`		Show version, date, time and chosen operating mode.
	Service 	Call up Service Mode.
`Password _`	Enter 	Enter Service Mode password.

If an invalid password was entered:

`Invalid password!`	Enter 	Repeat password entry.
	Return 	Return to basic step.

Abort entry of password

`Password ****`		Hold key down to abort entry of password and return to basic step.



Service Mode:

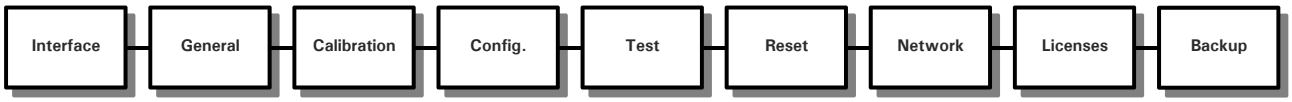
Select  Press **F1** repeatedly to show individual groups of the Service Mode.

OK  Call up displayed group or

Return  Return to normal operation.

`Select: Service`	Service settings.
`Select: Application`	Configuration of application.
`Select: Format`	Configuration of print format and operation sequence (see chapter 'Configuration of print format (Format).'
`Select: Reset`	Reset Application parameters to factory settings (see chapter 'Reset (Application)')

5.3 Service Settings



Choice in Service settings:

Select (F1) — Press **F1** repeatedly to show the individual groups of the Service settings.

OK — Call up displayed group or

Return (F4) — Return to normal operation.

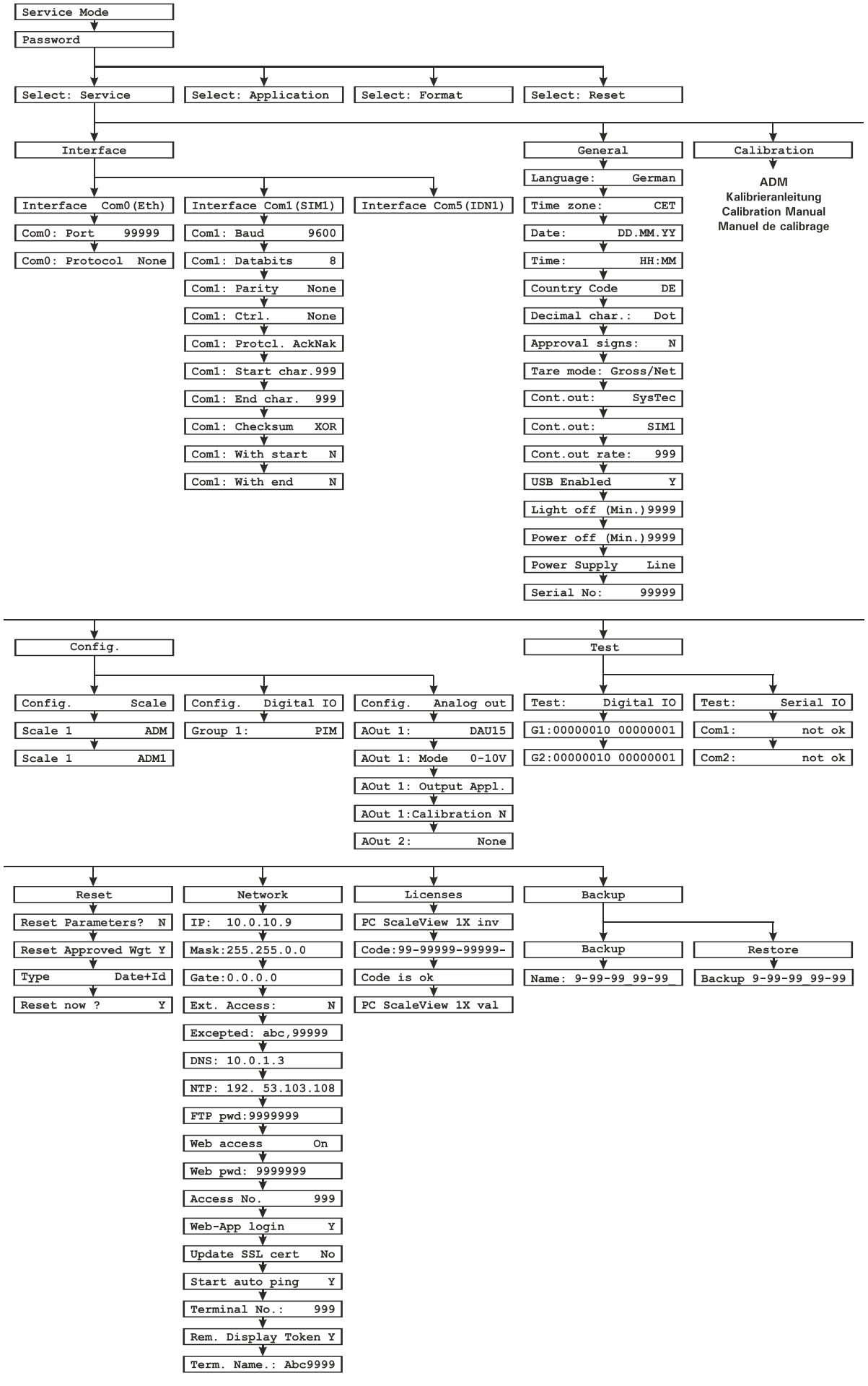
`Service: Interface`	Configure interfaces; (see chapter 'Interface Configuration (Interface)')
`Service: General`	Enter setup parameters (language, format of date, etc.); (see chapter 'Entry Of Parameters (General)')
`Service: Calibration`	Calibrate scale; (see chapter 'Calibration')
`Service: Config.`	Configure scale, digital I/Os, analog outputs (see chapter 'Configuration (Config.)')
`Service: Test`	Test hardware; (see chapter 'Hardware Test (Test)')
`Service: Reset`	Load factory defaults; (see chapter 'Reset')
`Service: Network`	Enter network settings; (see chapter 'Network') **Note:** This menu is only available with network connection.
`Service: Licenses`	Activate license for PC *ScaleView* (see chapter 'Licenses')
`Service: Backup`	Data backup and restoring (see chapter 'Backup')

On exiting the Service Mode the entered / edited parameters are stored.

`Saving...`	Exit Service Mode, store changes, return to normal operation.

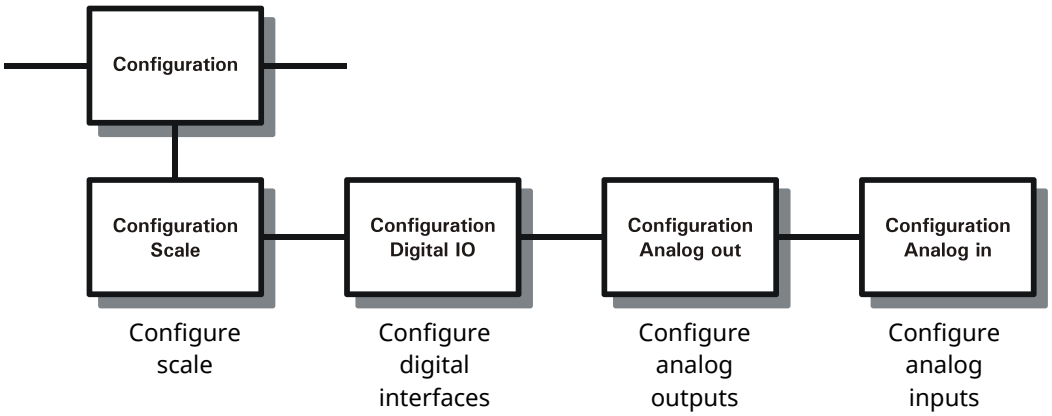
! CAUTION
Under no circumstances switch off power while 'Saving...' is displayed, because that will inevitably destroy the contents of the Flash-EPROM and thus the program.

5.4 Overview Service Mode



6 Configuration (Config.)

From the Service Settings menu choose group 'Config.'



6.1 Set Up Scale Interfaces

Config. Scale

Set Up Scale

OK

Scale 1 ADM

Select

Select scale driver for first scale:

- **ADM** Analog scale base
- **SBI** MC1 compatible protocol (SBI) **[1)]**
- **IDNet** Mettler IDNet protocol
- **xBPI** Minebea Intec IS scale base (digital)
- **Flintec** Flintec protocol
- **MT-SICS** Mettler-Toledo protocol
- **KERN** KERN protocol of series EW and DS
- **HBM** HBM protocol
- **None** Disable scale

For optional interfaces depending on chosen scale see table below.

[1)] Parameters of the Minebea Intec scale must be set to:
MC1 protocol (SBI), 7 Bit, odd parity, 1200 Baud, RTS/CTS, streaming mode, 16-character data string.

Note: Parameter protected with jumper.

Scale 1 ADM1

Select

Chosen scale interface:

- **ADM1** ADM in socket ADM1
- **SIM 1-x** via serial interface
- **IDN1** IDN in socket ADM1
- **DWB1** DWB in socket ADM1

6.1.1 Options for setting of scale driver

	ADM1	SIM1	IDN1	DWB1
ADM	**ADM**	**SIM**		**DWB**
SBI		**SIM**		
IDNet		**SIM**	**IDN**	
xPBI				**DWB**
Flintec				**DWB**
MT-SICS		**SIM**		
Kern		**SIM**		
HBM				**DWB**

6.1.2 Adding scale drivers

Supplementary scale drivers can be loaded using the SysTec software IT *CONFIGURATOR* or RTC *WIN*.
Connect to the weighing terminal and call up the menu item 'Load firmware.'
Select the respective scale driver, e.g. VPGT-SLC2-YYYYMMTT.1.sfw.
The driver is loaded into the terminal and is subsequently available in the configuration.

6.2 Configure Digital I/Os

`Config.  Digital IO`	OK 	Configure digital I/Os
`Group 1:  PIM`	Select 	Configure first group of I/Os: • **PIM** Internal I/Os PIM1 • **REL/TRIO** External relay / transistor module REL485/TRIO485 connected via serial interface • **SIO** I/O module in socket SIMx • **None** Not applicable

REL/TRIO or SIO selected:

`Group 1: Port  SIM1`	Select 	Assignment of an external relay/transistor module to a serial interface SIM1–SIMx

`Group 2:  None`	Select 	Continue with next I/O group

6.3 Configure Analog Outputs

```
Config.   Analog out
```

OK

```
AOut 1:          MAI
```

Select — Select analog output:

- **MAI** External analog output module
- **DAU8** internal 8-bit analog output module
- **DAU15** internal 15-bit analog output module
- **None** Not applicable

MAI chosen

```
AOut 1: Port    SIM1
```

Select — Select pertaining internal serial interface:

- **SIM1–SIMx**

```
AOut 1: Address    0
```

Select — Select pertaining internal address:

- **Address 0–Address 7**

```
AOut 1: Module    X1
```

Select — Select external MAI module:

- **Module X1–module X4**

DAU15/DAU8 chosen

```
AOut 1: PIM        1
```

Select — Select pertaining internal digital interface:

- **PIM1–PIMx**

```
AOut 1: Mode   0-10V
```

Select — Select type of output signal:

- **0–10 V, 2–10 V, 0–20 mA, 4–20 mA**

```
AOut 1: Output Appl.
```

Select — Select operating mode:

- **Appl.** Controlled by application program
- **Gross** Gross weight
- **Net** Net weight

Gross or Net selected:

```
AOut 1: Scale      1
```

+1 0 — Enter scale for output of gross / net weight.

```
AOut 1:Calibration N
```

Fine tuning of min. and max. output signal:

No — No fine tuning

Yes — Fine tuning by means of multimeter

Calibrate output signal (Calibration = Y):

`AOut 1:  0V =  0`	Calibrate zero signal, e.g. =0 V
- 	Stepwise decrease analog signal.
+ 	Stepwise increase analog signal.
`AOut 1: 10V =  4095`	Calibrate full signal, e.g. 10 V
- 	Stepwise decrease analog signal.
+ 	Stepwise increase analog signal.

Note: The calibrated values are overwritten when the type of the output signal is changed.

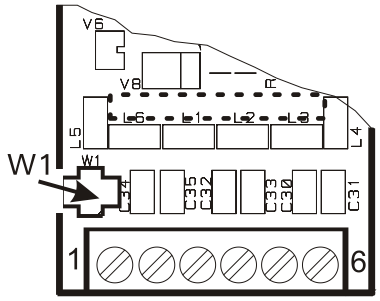
`AOut 2:  None`	Select  Continue with next analog output.

7 Calibration

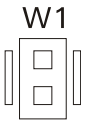
Described below is only the *access* to the calibration mode, for a detailed description of the calibration procedure, refer to the following manuals:

- Calibration Manual IT1/IT3 ADM/DADM, order No. ST.2309.1771
- Calibration Manual IT1/IT3 Digital Scale Connection, order No. ST.2309.1781
- Calibration Manual IT1/IT3 IDNet MultiRange, order No. ST.2309.1776

Prior to power-up the jumper W1 must be removed. Only with this jumper setting can the changed parameters be saved in memory after the calibration



Calibration released



From the Service Settings menu choose group 'Calibration.'

`Calibrate Scale 1`	Log 	Show error protocol of scale
	Master 	Call up Master Mode
	OK 	Access To Calibration Mode

If jumper W1 is still in place:

`Calibration Locked`		Warning: Jumper not in calibration position, parameters cannot be saved!
	OK 	Enter calibration mode without saving (e.g. to check settings).

Before exiting calibration with the  key:

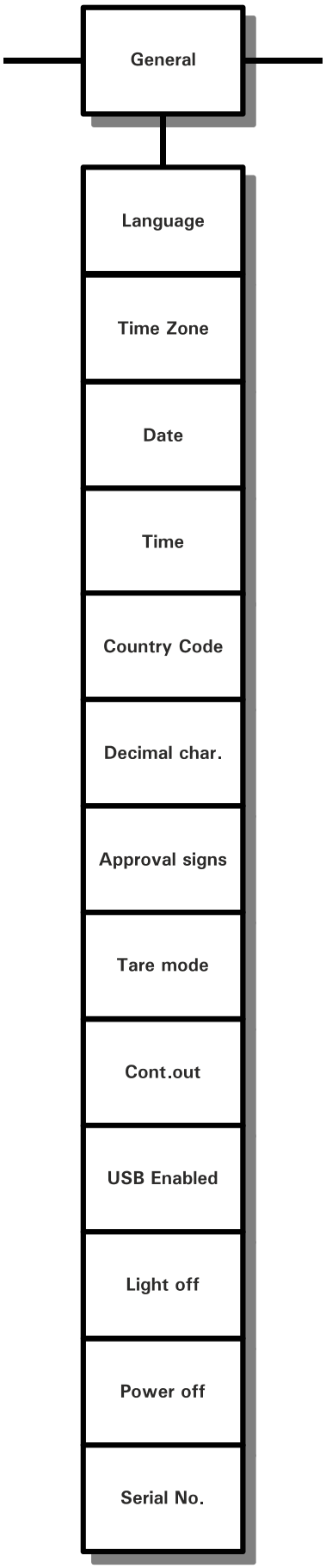
`Save Parameters ?  Y`		Saving of calibration data.
	Yes 	Save parameters
	No 	Ignore all changes, do not save data

If jumper W1 on ADM module is still in place:

`Not saved`	Note: changes have not been saved because calibration data are secured by jumper W1 (see chapter 'Securing Scale Parameters').

8 Entry Of Parameters (General)

From the Service Settings menu choose group 'General.'



Language: German

Select F1 Select language:

- **German**
- **English**
- **French**
- **Polish**
- **Spanish**
- **Russian**
- **Dutch**
- **Czech**
- **Portuguese**
- **Turkish**

German chosen:

Keyboard: de

Select F1 USB keyboard layout:

- **de** Germany / Austria
- **ch** Switzerland

English chosen:

Keyboard: us

Select F1 USB keyboard layout:

- **us** USA
- **gb** Great Britain

French chosen:

Keyboard: fr

Select F1 USB keyboard layout:

- **fr** France
- **ch** Switzerland

Time Zone: CET

Select F1 Select time zone:

- **CET** = Central European Time
- Other time zones:
  Canada, EET, EST, Etc, Europe, GB, GMT, HST, MET, MST, Mideast, NZ, Pacific, Singapore, UCT, US, UTC, WET, Africa, America, Asia, Atlantic, Australia, Brazil
- With 'Etc' a time difference to GMT can be chosen.

Automatic summer / winter time switching is made in accordance with the chosen time zone.

Time Zone: Dublin

Select F1 For some entries the particular location must be specified, e.g. 'Dublin.'

```
Date:          DD.MM.YY
```

Select 

Select format of date:

DD.MM.YY	**MM.DD.YY**	**YY.MM.DD**
DD-MM-YY	**MM-DD-YY**	**YY-MM-DD**
DD/MM/YY	**MM/DD/YY**	**YY/MM/DD**
DD.MM.YYYY	**MM.DD.YYYY**	**YYYY.MM.DD**
DD-MM-YYYY	**MM-DD-YYYY**	**YYYY-MM-DD**
DD/MM/YYYY	**MM/DD/YYYY**	**YYYY/MM/DD**

```
Time:          HH:MM
```

Select 

Select format of time:

- **HH:MM**
- **HH:MM:SS**

H=hour M=minute S=second

```
Country Code:      XX
```

Country code of country of installation (required for compliance with locally applicable W&M regulations).

2-character code following ISO-3166-2, e.g.:

- **DE** Germany
- **GB** Great Britain
- **CA** Canada
- **NL** Netherlands

Note: Parameter protected with jumper

```
Decimal char.:   Dot
```

Select 

Select character to separate decimals:

Select character to separate decimals:

- **Dot** (e.g. 0.00)
- **Comma** (e.g. 0,00)

Note: Parameter protected with jumper.

```
Approval signs:    N
```

Select 

Select approval signs:

Select approval signs:

- **Y** Weights are printed with approval signs in compliance with former PTB regulations:
  Example: Gross/Tare/Net
  `<25,45kg> / <10,00kg>  / <15,45kg>`
  or
  `<25,45kg> /  10,00kgPT /  15,45kgC`
- **N** Weights are printed in compliance with EC regulations:
  Example: Gross/Tare/Net
  `25,45kg / 10,00kgT  / 15,45kgN`
  or
  `25,45kg / 10,00kgPT / 15,45kgN`

Note: Parameter protected with jumper.

Tare mode: Gross/Net	Select F1	Select tare mode:

- **Gross/Net**
  press tare key to toggle gross / net display and back;
- **Auto clear**
  on return to the zero range the tare weight is automatically cleared;
- **Net=0**
  every time the tare key is pressed the scale is auto-tared, on return to the zero range the tare weight is automatically cleared and the display returns to gross mode.

Cont.out: Off	Select F1	Setting for continuous output:

- **SysTec** SysTec format
- **Flintec** Flintec format
- **Customized** Freely defined format
- **Sys.Remote** IT1/IT1000 Remote Display via serial interface
- **Toledo** TOLEDO® format
- **Schauf** Schauf format
- **CAS** CAS format
- **GS** Gebhardt&Schaefer protocol with support of traffic light function
- **SPEC1** Customized format
- **MT-SICS** MT-SICS protocol
- **SPEC2** Customized format
- **ToledoS** Customized format
- **Off** Continuous output disabled

Data strings of the continuous output are described in the 'Continuous Output' Technical Manual.

Continuous output enabled:

Cont.out: SIM1	Select F1	Choose serial interface for continuous output:

- **Eth, SIM1–SIMx**

Eth chosen:

Cont.out port:99999	TCP/IP port for the external connection. Default: 1900

Cont.out rate: 99	Entry of number of updates per second for the continuous output. Max. rate: 50.

Customized format chosen:

:AAAAAAAAAA	String for freely defined format, see 'Continuous Output' Technical Manual.

'Toledo' or 'ToledoS' chosen:

With Checksum Yes	Record with or without checksum

'Cont.out' ≠ Off

Cont.out2: Off	Select F1	Settings for continuous output #2: see section 'Cont.out'

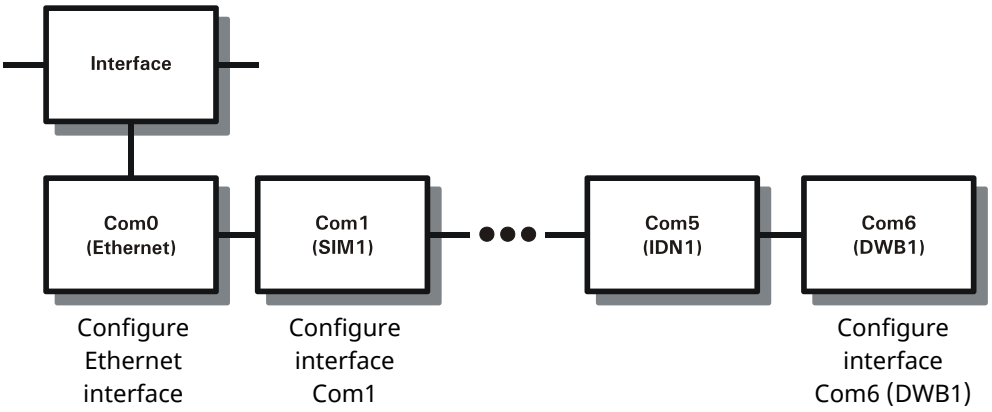
`USB Enabled Y`	• **Y** The system integrates all USB devices if they are supported. • **N** All USB devices are blocked.
`Light off (Min.) 99`	If terminal is not in use, the backlighting is dimmed after this time has elapsed (power-save for battery operated terminals). Press any key or load scale to switch backlighting on again. Enter 0 to disable this function.
`Power off (Min.) 99`	Enter time in minutes after which the terminal is switched off when it is not in use (power-save function for battery operated terminals). **Note:** The switch S100 must be in position 1 when 'Power Off' ≠ 0 is configured.
`Serial No 9999999999`	Entry of 10-digit serial No. of device. Must be identical to number printed on nameplate. For the communication with the software PC *ScaleView*, this variable is read out and displayed in the software PC *ScaleView*! It is thus relevant for compliance. **Note:** Parameter protected with jumper.

Only for IT1-BATT battery version:

`Power Supply Line`	Specify type of connected power supply: • **PB12** 12 V lead battery • **PB24** 24 V lead battery • **Adjust** Not specified (adjustable) • **Line** Perm. DC supply See chapter 'Connection To External Battery 12–24 V DC (IT1-BATT)'

9 Interface Configuration (Interface)

From the Service Settings menu choose group 'Interface.'



Note: The setting of parameters must correspond to those of the connected peripheral devices.

9.1 Configuration of Ethernet interface

```
Interface  Com0(Eth)
```

OK

```
Com0: Port    99999
```

Enter port

```
Com0: Protocol  None
```

Select

Select protocol of Com0:

- **None** Raw data only
- **TTY** Printer protocol (data only)
- **AckNak** ACK / NAK procedure with confirmation
- **NoAck** NO-ACK procedure without confirmation

If 'TTY' was selected as printer protocol:

```
Com0: Codepage  None
```

Select

Select character set of output:

- **None** ISO8859 in accordance with chosen language
- **850** DOS Codepage 'Western Europe' (obsolete printers)
- **852** DOS Codepage 'Central Europe'
- **866** DOS Codepage 'Russia'
- **Star** DOS Codepage Star printers

```
Tab             ESC/P
```

Select

Select mode of horizontal alignment for the print fields:

- **ESC/P** Horizontal alignment with tab function according to ESC/P® protocol
- **Spaces** Horizontal alignment by insertion of spaces

If 'AckNak' or 'NoAck' was selected as protocol:

`Com0: Start char.999`

Entry of start character as decimal value (e.g. 2 = STX)
For entry '0' no start character is transmitted.

`Com0: End char.  999`

Entry of end character as decimal value (e.g. 3 = ETX)
For entry '0' no end character is transmitted.

`Com0: Checksum  None`

Select F1

Select method to calculate the checksum which is transmitted behind the end character:

- **None** No Checksum
- **XOR** Exclusive-Or checksum
- **CPL** Complement of two

If a start or end character was specified and a checksum was selected:

`Com0: With start   N`

Yes

Y: The start character is included in the checksum calculation

`Com0: With end     N`

Yes

Y: The end character is included in the checksum calculation

9.2 Configuration Of Serial Interfaces

`Interface Com1(SIM1)`

Select F1

Continue with interface Com1

`Com1: Baud       9600`

Select F1

Select baud rate of Com1:

- **300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200**

`Com1: Databits     8`

Select F1

Select data format for serial interface Com1:

- **7 data bits, 8 data bits**

Always 1 stop bit is transmitted.

`Com1: Parity     None`

Select F1

Select parity for interface Com1:

- **None**
- **Even**
- **Odd**

`Com1: Ctrl.      None`

Select F1

Select hardware handshake for interface Com1:

- **XOn/XOff**
- **RTS/CTS**
- **None** no transmission control

Note: RTS/CTS not possible on Com2!

`Com1: Protcl.  None`	Select  Select protocol of Com1:

- **None** Raw data only
- **TTY** Printer protocol (data only)
- **AckNak** ACK / NAK procedure with confirmation
- **NoAck** NO-ACK procedure without confirmation

If 'TTY' was selected as printer protocol:

`Com1: Codepage  None`	Select  Select character set of output:

- **None** ISO8859 in accordance with chosen language
- **850** DOS Codepage 'Western Europe' (obsolete printers)
- **852** DOS Codepage 'Central Europe'
- **866** DOS Codepage 'Russia'
- **Star** DOS Codepage Star printers

`Tab  ESC/P`	Select  Select mode of horizontal alignment for the print fields:

- **ESC/P** Horizontal alignment with tab function according to ESC/P® protocol
- **Spaces** Horizontal alignment by insertion of spaces

If 'AckNak' or 'NoAck' was selected as protocol:

`Com1: Start char.999`	Entry of start character as decimal value (e.g. 2 = STX) For entry '0' no start character is transmitted.
`Com1: End char.  999`	Entry of end character as decimal value (e.g. 3 = ETX) For entry '0' no end character is transmitted.
`Com1: Checksum  None`	Select  Select method to calculate the checksum which is transmitted behind the end character:

- **None** No Checksum
- **XOR** Exclusive-Or checksum
- **CPL** Complement of two

If a start or end character was specified and a checksum was selected:

`Com1: With start  N`	Yes  **Y:** The start character is included in the checksum calculation
`Com1: With end  N`	Yes  **Y:** The end character is included in the checksum calculation

9.3 Configuration For PC *ReadIT*

9.3.1 Ethernet

```
Interface  Com0(Eth)
```
OK

```
Com0: Port       1234
```
Enter port 1234

```
Com0:Protocol AckNak
```
Select — Select protocol of Com0:

- **AckNak** ACK / NAK procedure with confirmation

```
Com0: Start char.  2
```
Entry of start character as decimal value (2 = STX)

```
Com0: End char.    3
```
Entry of end character as decimal value (3 = ETX)

```
Com0: Checksum   XOR
```
Select — Select method to calculate the checksum which is transmitted behind the end character:

- **XOR** Exclusive-Or checksum

```
Com0: With start   N
```
No — **N:** The start character is not included in the checksum calculation

```
Com0: With end     Y
```
Yes — **Y:** The end character is included in the checksum calculation

9.3.2 Serial Transmission

```
Interface Com1(SIM1)
```
Select

```
Com1: Baud       9600
```
Select — Select baud rate of Com1:

- **300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200**

Suitable for host

```
Com1: Databits     8
```
Select — Select data format for serial interface Com1:

- **7 data bits, 8 data bits**

Always 1 stop bit is transmitted.
Suitable for host

```
Com1: Parity    None
```
Select — Select parity for interface Com1:

- **None**
- **Even**
- **Odd**

Suitable for host

Com1: Ctrl. None

Select

Select hardware handshake for interface Com1:

- **XOn/XOff**
- **RTS/CTS**
- **None** no transmission control

Note: RTS/CTS not possible on Com2!
Suitable for host

Com1: Protcl. AckNak

Select

Select protocol of Com1:

- **AckNak** ACK / NAK procedure with confirmation

Com1: Start char. 2

Entry of start character as decimal value (2 = STX)

Com1: End char. 3

Entry of end character as decimal value (3 = ETX)

Com1: Checksum XOR

Select

Select method to calculate the checksum which is transmitted behind the end character:

- **XOR** Exclusive-Or checksum

Com1: With start N

No 

N: The start character is not included in the checksum calculation

Com1: With end Y

Yes 

Y: The end character is included in the checksum calculation

10 Network

From the Service Settings menu choose group 'Network.'

Note: This menu is only available when network connection has been established.

Network settings for Ethernet interface of weighing terminal:

IP 10.0.10.9

Entry of the IP address for the local net:

Note: The weighing terminal does not support DHCP and requires a permanent IP address.

Mask 255.255.0.0

Entry of subnet mask

Gate 0.0.0.0

Entry of gateway IP address, if applicable

Ext. Access: Y

Select F1

Allow network access:

- **Y**
  Unrestricted network access
- **N**
  Network access from outside allowed for certain ports only. Network access is blocked if no ports are excepted by the following menu item.
- **Limited**
  Network access from outside allowed for certain ports only. The ports 22 and 1999 are enabled by default.

Note: The network access restriction takes effect as soon as the group 'Network' is terminated. This cuts all communication between weighing terminal and not-excepted external functions, including – if applicable – remote control and remote maintenance!

If network access is restricted (Ext. Access ≠ Y)

Excepted: ftp,1234

Firewall function:

Enter a list of ports or services (comma-separated) that may be accessed from outside, e.g. 'ftp,1234,1999.' Alternatively enter the name of the function to be enabled.

By default, ports are made available for TCP and UDP protocol.

If the ports should only be available for certain protocols, this has to be specified by putting them behind a numerical port designation with a preceding slash mark, e.g. 'ftp,1234/tcp/udp,1999/tcp.'

For an overview of selectable ports, please refer to chapter 'Firewall Function.'

DNS: 10.0.1.3

Entry of DNS server

NTP: 192.53.103.108

Entry of NTP server for time synchronization, this requires entry of time zone.

Example for ptbtime1.ptb.de

FTP pwd: 9999999

Entry of password for FTP access to the shared directory.

- **Shared directory** User 'shared'
- **USB device** User 'usbshared'

Web access Off

Select F1

Enable / disable access to data via web browser.

For a description of SysTec Web Interface, refer to:

- Web Interface Operation Manual, order No.: ST.2309.1692

Web Access=On:

`Web pwd: 9999999`		Specify administrator password
`Access No. 999`		Max. number of users who may be logged in at the same time.
`Web-App login N`	Yes 	Enter Y(es) or N(o) to choose whether or not a login with user name and password is required for access via web browser.
`Update SSL cert No`	Yes 	Yes: Creation of a certificate and storage in the FTP folder.

`Start auto ping Y`	Yes 	Start sending ICMP packages to the gateway.

Note: In some networks ARP broadcast may be disabled which can lead to problems with the communication between WiFi controller and the module. In this case, sending an ICMP package to the network gateway at regular intervals can rectify the problem. The effect is that the IP address and the hardware address are entered in the controller. Since the controller discards this information after a few minutes, it is required to send the package at regular intervals. When 'Auto Ping' is enabled, an ICMP package is sent every 60 seconds.

`Terminal No.: 999`	Entry of terminal No. for the network name. The network name is generated from the terminal type and the terminal No. Example: IT1_001, IT1_123

If a valid license has been entered in 'Service: Licenses':

`Rem. Display Token Y`	Yes 	Y: Entry of a Remote Display Token for PC *ScaleView.*
`Term. Name.:_`		Entry of the terminal name for PC *ScaleView*.

For a detailed description, refer to:

- PC *ScaleView* Operation Manual, order No. ST.2309.2070

11 Licenses

Choose group 'Licenses' from the Service settings menu.

A license key is needed to connect a terminal with a PC or mobile device via PC *ScaleView*.

PC ScaleView 1X invalid	Display: License for the connection of 1 device not activated
PC ScaleView 1X invalid	Select (F1) Select type of license:

- **1X** Allows the secondary display connection of 1 device
- **2X** Allows the secondary display connection of 2 devices
- **4X** Allows the secondary display connection of 4 devices
- **First 1X** Allows the primary display connection of 1 device
- **First 2X** Allows the primary display connection of 2 devices
- **First 4X** Allows the primary display connection of 4 devices

OK

Code:99-99999-99999-	Enter license code

OK

Code is ok	Message: License key is valid
PC ScaleView 1X valid	Display: License for the connection of 1 device activated

License key invalid

Invalid Code

For a detailed description, refer to:

- PC *ScaleView* Operation Manual, order No. ST.2309.2070

12 Backup

Choose group 'Backup' from the Service settings menu.

This menu provides functions to save and restore data of the weighing terminal using a USB memory stick. Insert the formatted USB stick into the USB socket. The USB stick has to be formatted in FAT32.

```
Backup:        Backup
```

Select

- **Backup** Save data
- **Restore** Restore data
- **Install FW** Install firmware

OK

12.1 Backup data

```
Backup:        Backup
```

OK

```
Name: 9-99-99_99-99_
```

OK — Display of backup file name consisting of date and time of backup.

Performing backup and system rebooting. The weighing terminal starts with basic step.

12.2 Restore data

```
Backup:       Restore
```

OK

```
Backup 9999-99-99_99
```

OK — Display of the first backup file.

```
Backup 9999-99-99_99
```

Select — Select backup file.

OK

Performing restore and system rebooting. The weighing terminal starts with basic step.

Error USB stick

```
No USB stick.
```

No USB stick present or stick not formatted correctly.

12.3 Data stored

12.3.1 Data included in the backup

- Files from the battery-backed RAM:
  - contents of the folder 'shared' (not applicable to IT1)
  - selection of the variables used by the application (nov variables, e.g. counters, totals)
- Files from the flash EPROM:
  - compiled application
  - firmware version last installed (scaletask, interpreter, IT Manager, etc.)
  - log file for the update history
  - all license information of the (Open Source) software used
  - list of all ports blocked by the firewall (if enabled)
  - configuration of the Service Mode
  - configuration parameters of the application
  - print formats
  - licensing keys (e.g. for PC *ScaleView*)
- XML configuration (*.rtcconfig)
- calibration data on the ADM, in hexadecimal format and as XML configuration tree for IT *CONFIGURATOR*

12.3.2 Data not included in the backup

- certificates and brandings

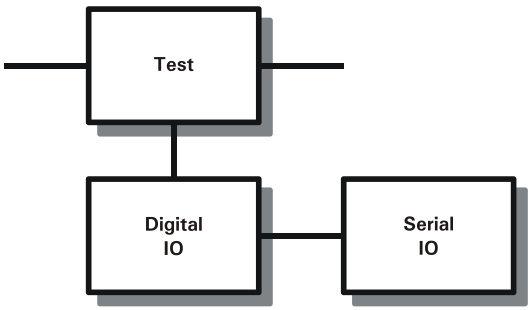
12.3.3 Please note when performing a 'restore'

- The IT Manager **will be overwritten** if the backup contains a version newer than the one running.

13 Test

W A R N I N G
Exercise utmost care when making checks, tests and adjustments that can actuate movable parts such as feeding devices, gates, flaps, conveyors, etc. Make absolutely sure that nobody is within reach of movable parts.
Failure to observe this precaution could result in bodily injury!

From the Service Settings menu choose group 'Test.'



13.1 Test Of Digital Inputs/Outputs

`Test:  Digital IO`	OK	
`G1:00000010 00000001`		Status information 0 or 1 for the first I/O group. Inputs are shown on the left, outputs on the right hand side (1 = input/output 'on'). The keys **F2** and **F3** are used to toggle the outputs (e.g. **F2** for output 1). The picture above shows the state: input 0, 2–7 = Off input 1 = On output 0 = On output 1–7 = Off
`G2:00000001 00100010`	Select	Continue with next I/O module (if applicable).

13.2 Test Of Serial Interface

`Test: Digital IO`	Select 
`Test: Serial IO`	
	OK 
`Com1: not ok`	Test of serial interface COM1 (RS232 and RS485-4-wire); RS232: jump lead from terminal 1 to 3 and from terminal 2 to 4 (connect TxD with RxD and RTS with CTS). RS485.4: jump lead from terminal 1 to 3 and from terminal 2 to 4 (connect TxD+ with RxD+ and TxD– with RxD–). **Note:** Test of RS485 2-wire and 20 mA interface is not possible.
`Com2: not ok`	Select  Continue with next interface.

14 Reset (Service Settings)

With this function values and parameters of the Service settings can be reset to factory settings. Parameters for calibration and network configuration remain unchanged.

From the Service Settings menu choose group 'Reset.'

14.1 Reset Parameters

```
Reset Parameters?  N
```

Yes 

Reset Service settings.

OK 

```
Resetting...
```

```
Reset Approved Wgt N
```

Continue with 'Delete W&M Approved Weight Storage'

Group	Setting
Interface	Com0: Port 1234
	Com0: Protocol None
	Com1: Baud 9600
	Com1: Databits 8
	Com1: Parity None
	Com1: Ctrl. None
	Com1: Protocl. None
	Com1: Start char. 0
	Com1: End char. 0
	Com1: Checksum None
General	Language: German
	Time zone: CET
	Date: DD.MM.YY
	Time: HH:MM
	Country Code: Empty
	Decimal char.: Dot
	Approval signs: N
	Tare mode: Gross/Net
	Cont.out Off
	Cont.out rate: 5
	Light Off (Min.) 0
	Power Off (Min.) 0

Group	Setting
Config.	Scale\Scale 1: ADM
	Scale\Scale 2: None
	Digital IO\Group 1: PIM
	Digital IO\Group 2: None
	Analog out\AOut 1: None
	Analog in\AIn 1: None
Network	Terminal No.: Empty

14.2 Delete W&M Approved Weight Storage (Data Archive)

> **CAUTION**
> **All records in the W&M approved data archive are irrevocably deleted.**

```
Reset Approved Wgt Y
```

Yes 

Delete W&M approved data archive

OK 

```
Type          Date+Id
```

Select 

Create W&M approved data archive.

- **Date+Id** With Date and Ident number (4 digits)
- **Cons.Id** With consecutive number (6 digits)

OK 

```
Reset now ?         Y
```

Yes 

Delete contents:

- **Y** Reset
- **N** Cancel

```
Resetting...
```

```
Service: Reset
```

15 Application (Choose Operating Mode)

Select: Application	Choose operating mode

Program: BASIC	Select  Select operating mode:

- ***BASIC*** Data logging / capturing
- ***COUNT*** Parts counting
- ***FILL*** Filling mode
- ***CHECK*** Checkweighing
- ***CHECK-IN*** Custom program for totalizing
- ***ONLINE*** Remote control from PC

Operating mode *FILL*:

Start Key: Enabled	Select  Enable / disable start-key ↵ function.

- **Enabled** enable start with ↵ **key**
- **Disabled** enable start via Input E0

Ack. filled weight N	Select  Manual acknowledgement of every fill weight after finishing filling:

- **Y** Operator must confirm fill weight.
- **N** Program automatically stores the weight value after finishing filling.

Notes:

- Manual acknowledgement must be active when the system is used as approved NAWI
- Parameter protected with jumper.

Operating mode *CHECK*:

– Zone: Red	Select  Select color of weight display for 'weight in – zone.'

Select color of weight display for 'weight in – zone.'

- **Red**
- **Orange**
- **Blue**
- **Green**

+ Zone: Orange	Select  Select color of weight display for 'weight in + zone.'

- **Orange**
- **Blue**
- **Green**
- **Red**

```
ok Zone:        Green
```

Select F1 — Select color of weight display for 'weight **ok**' zone.

- **Green**
- **Red**
- **Orange**
- **Blue**

Operating mode *ONLINE*:

```
Online : SICS
```

Select F1 — Select protocol for remote control from PC:

- **SICS** MT-SICS protocol
- **DEMAND** MT-DEMAND protocol
- **IDNET** TOLEDO® protocol
- **STANDARD** SysTec protocol

'DEMAND' protocol chosen:

```
Mode: Weight Display
```

Select F1 — Select format of the response string transmitted to answer the 'P' command:

- **Weight Display** Weight only
- **Single Line** Gross, tare and net weight as single line
- **Multi Line** Gross, tare and net weight as one line each

Operating mode *ONLINE*:

```
Tare Key:  Enabled
```

Select F1 — Enable / disable tare key.

- **Disabled** Tare key disabled
- **Enabled** Tare key enabled

Operating mode *BASIC* or *COUNT*:

```
Output0:        LT S1
```

Select F1 — Select control of Output 0:
Digital output (installation of PIM required) set if:

- **LT S1** Net weight < S1 (Less S1)
- **GT S1** Net weight > S1 (Greater S1)
- **In S1-S2** Net weight > S1 & < S2 (Between S1–2)
- **Out S1-S2** Net weight < S1 or > S2 (Outside S1–2)

```
Output1:        LT S2
```

Select F1 — Select control of Output 1:
Digital output (installation of PIM required) set if:

- **LT S2** Net weight < S2 (Less S2)
- **GT S2** Net weight > S2 (Greater S2)
- **In S1-S2** Net weight > S1 & < S2 (Between S1–2)
- **Out S1-S2** Net weight < S1 or > S2 (Outside S1–2)

```
Output2:        LT S2
```

Select F1 — Select control of Output 2:
Digital output (installation of PIM and SIO or REL/TRIO required) set if:

- **LT S2** Net weight < S1 (Less S2)
- **GT S2** Net weight > S1 (Greater S2)
- **In S1-S2** Net weight > S1 & < S2 (Between S1–2)
- **Out S1-S2** Net weight < S1 or > S2 (Outside S1–2)

Output2 is only shown when the following choices have been made in the 'Service Mode\Service\Config. Digital IO' menu:

- Group1: REL/TRIO
  or
- Group1: PIM
  Group2: SIO, REL/TRIO

Note: The free assignment of functions to the outputs applies only to the operating modes *BASIC* and *COUNT*. In all other cycles this assignment is part of the application program.

Operating mode *BASIC*:

`Print mode: Standard`

Select 

Print mode:

- **Standard**
  Standard function of the ↵ **key** and the corresponding digital input
- **Auto**
  Automatic printing after exceeding the first setpoint
- **Once**
  One print only after pressing the ↵ **key** or activating the digital input. Next print release only possible afterunloading the scale or after weight falls below setpoint 1.

`Auto Tare?  N`

Yes No 

Automatic taring when Gross > S1 and Gross < S2.
Tare is automatically cleared when scale is settled and weight below S1.

Note: Only one option either SIM-USB **or** SIM-NET **or** SIM **or** SIO can be used. Simultaneous use of more than one option is not allowed!

`Host Port:  Ethernet`

Select 

Interface for data transmission:

- **None** no data transmission
- **Ethernet** via Ethernet
- **SIM1** via serial interface

Operating mode *ONLINE* and 'Standard' protocol chosen:

`Response with CR/LF Y`

Yes No 

Select whether response strings sent by the terminal shall be terminated with the control characters CR and LF:

- **Y:** Response with CR/LF
- **N:** Response without CR/LF

`Print Port:  SIM1`

Select 

Printer interface:

- **None** no printer
- **Ethernet** via Ethernet
- **SIM1** via serial interface
- **USB** via USB

Ethernet chosen:

`IP`

Enter IP address for the local network.

```
Codepage:        None
```

Select F1

Character set for output:

- **None** ISO8859 in accordance with chosen language
- **850** DOS Codepage 'Western Europe' (obsolete printers)
- **852** DOS Codepage 'Central Europe'
- **866** DOS Codepage 'Russia'

Operating mode *BASIC*, *COUNT* or *CHECK*:

```
Input 0: Capture weight
```

Select F1

Assignment of input E0:

- **Capture weight**
- **Set zero**

Note: Not applicable if output A2 is available.

Operating mode *BASIC*:

```
Peak Hold?           Y
```

Yes No

Enable / disable automatic saving and display of last net-weight peak.

- **N:** Peak hold disabled
- **Y:** Peak hold enabled

Operating mode *BASIC*, *COUNT*, *FILL* or *CHECK*:

```
Wgt var leading ch: Space
```

Select F1

Select the type of leading characters to format the weight variables gross, tare and net without unit:

- **None** without leading characters
- **Space** leading spaces
- **Zero** leading zeros

Operating mode *BASIC*:

```
Show barcode:   Code 128
```

Select F1

Select type of configurable barcode to be displayed while scale is settled.

- **Off** no barcode
- **Code 128** show Code 128
- **QR code** show QR code

Note: Additional firmware update required.

Code 128 oder QR code gewählt

```
BC Field 1:         Date
```

Select F1

Select variable for first field of barcode:

- **Not used** end of selection
- **Date**
- **Time**
- **Gross**
- **Tare**
- **Net**
- **Scale No.** always 1
- **Terminal No.** Terminal No. as set in Service Mode, group 'Network'
- **Ident No.** Ident No. of record in weight memory

`BC Field 2: Not used`	Select: Select variable for next field. **Note:** The selection of variables is finished as soon as 'Not used' is selected for a field.

Ident No. selected as variable:

`Barcode show time[s]:10`	Entry of time in seconds for which the barcode should be displayed after performing a weighing cycle.

Code 128 or QR code selected:

`Barcode unit: N`	Yes / No: Selection of whether the weight values are to be displayed in the barcode formatted, with unit signs: • **N:** Weights as purely numerical values • **Y:** Weights with unit sign and 'C' or 'PT' if applicable.

Code 128 or QR code selected:

`Barcode separator: N`	Yes / No: Selection of whether the individual fields are to be displayed in the barcode separated by a separator character: • **N:** no separator • **Y:** semicolon as separator

Operating mode *ONLINE* with protocol 'Standard':

`Keylock input: off`	Select: Selection of the digital input for switching on the keyboard lock: • **off** no keylock • **IN0** keyboard can be locked by setting input IN0 • **IN1** keyboard can be locked by setting input IN1

15.1 Function Of Inputs And Outputs In Chosen Operating Mode

Op. mode	Input E0	Input E1	Output A0	Output A1
BASIC	Signal: Capture weight / Set zero *	Signal: Taring	Depending on Service Mode setting: 'Assignment of output'	
COUNT	Signal: Capture weight / Set zero *	Signal: Taring	Depending on Service Mode setting: 'Assignment of output'	
FILL	Signal: Start	Signal: Interrupt	Feeding device: Filling fast	Feeding device: Filling slow
CHECK	Signal: Capture weight / Set zero *	Signal: Taring	Status 'Weight ok'	Status 'Out-of-tolerance'
ONLINE SysTec Standard	Keylock **	Keylock **		

* Depending on Service Mode setting: 'Assignment of input E0'

** Depending on Service Mode setting: 'keylock input'

If Output A2 available:

Op. mode	Input E0	Output A0	Output A1	Output A2
CHECK	Signal: Zero setting / Taring	'weight in — zone'	'weight ok'	'weight in + zone'

Note: The assignment of input E0 does not apply if an output A2 is installed.

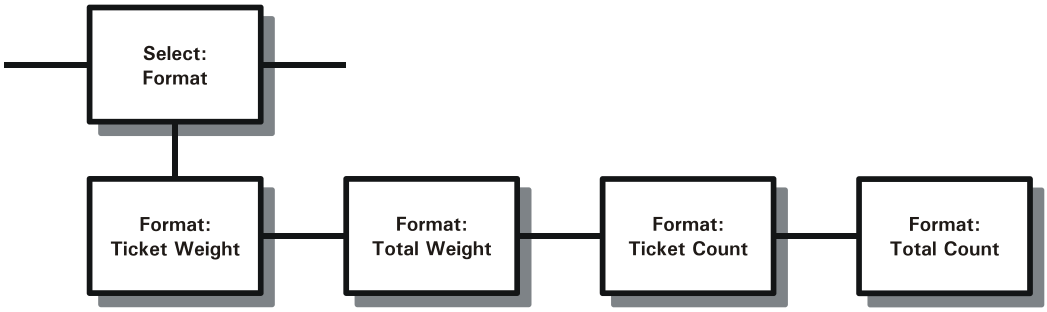
16 Configuration Of Print Format (Format)

IT1 allows to adapt the standard print format of the weighing terminal to existing forms and processes. Variables and texts can be placed freely on the form. Print fields not used can be hidden. Texts can be edited freely.

Note:

- It is not possible to add new text fields. This is only possible if the print formats are edited using the PC software RTC *CONFIGURATOR* or IT *CONFIGURATOR*. For free text entries, the 5 empty fields may be used which can be found at the end of each print format.
- If a network printer is used, single weighing printouts have to contain the date and the Ident No. of the record in the data archive in addition to the weighing results in order to comply with the W&M regulations.

Choose group 'Select: Format' from Service Mode menu:



`Select:  Format`	Configure print formats
`Format:Ticket Weight`	Select: Select print format: • **Ticket Weight** single weighing printout • **Total Weight** total weighing printout • **Ticket Count** single count printout • **Total Count** total count printout
`Edit Ticket`	OK: Continue
`Field  1`	Entry of field No. that you want to edit
`F01 Line  1`	Entry of the line No. for the chosen field
`F01 Column  1`	Entry of the column No. for the chosen field
`Prefix _`	Entry of a control character that is transmitted preceding the field Use ASCII code to enter control characters. Control characters are separated with commas or spaces.
`Text  Date`	Field content: text or name of variables Texts can be edited.
`Suffix _`	Entry of a control character that is transmitted after the field Use ASCII code to enter control characters. Control characters are separated with commas or spaces.

`Sel.Attr.1 none`	Select  Select the 1st print attribute of the chosen field: • **none** • **bold** • **underline** • **condensed** • **italic** • **expanded**
`Sel.Attr.2 none`	Select  Select the 2nd print attribute of the chosen field
`Sel.Attr.3 none`	Select  Select the 3rd print attribute of the chosen field
`Sel.Attr.4 none`	Select  Select the 4th print attribute of the chosen field
`Field 2`	Continue with next field

...

After the last field or when key **F4** (Return) is pressed when in step 'Field 1':

`General`	Entry of control sequences for start and begin of the print
`Prefix _`	Entry of the control character that is transmitted preceding the print start Use ASCII code to enter control characters. Control characters are separated with commas or spaces.
`Suffix _`	Entry of the control character that is transmitted after the end of the print, e.g. '12' for a form feed Use ASCII code to enter control characters. Control characters are separated with commas or spaces.
`Save Entries? N`	Selection Save Entries Yes/No
`Format: Ticket Weight`	Return to step 'Select print format'

16.1 Standard print format

The following section describes the print formats for single weighings and totals using the factory default settings. The content of text fields is written in quotation marks ('text'). Variables are written in bold type. The print formats can be edited using the PC software RTC *CONFIGURATOR* or IT *CONFIGURATOR* or via the weighing terminal.

Note: If a network printer is used, single weighing printouts have to contain the date and the Ident No. of the record in the data archive in addition to the weighing results in order to comply with the W&M regulations.

Ticket Weight (single weighing printout)

Field	Line	Column	Content
1	1	1	'Date'
2	1	12	**date,** 8 or 10 digits, depending on configuration
3	2	1	'Time'
4	2	12	**time,** 5 or 8 digits, depending on configuration
5	3	1	'Cons.No.'
6	3	12	**ConsecNo (= consecutive no.)** 5 digits
7	0	0	**alibino (=Ident No.)** 4 or 6 digits
8	4	1	'Gross'
9	4	12	**fgross (=gross weight)** max. 12 digits
10	5	1	'Tare'
11	5	12	**ftare (=tare weight)** max. 12 digits
12	6	1	'Net'
13	6	12	**fnet (=net weight)** max. 12 digits
14	0	0	'Peak'
15	0	0	**sPeakMax (= peak max. of peak-hold function)** 11 digits
16	0	0	**gross (=gross weight)** 8 digits
17	0	0	**tare (=tare weight)** 8 digits
18	0	0	**net (=net weight)** 8 digits
19	0	0	**Unit (= weight unit)** 2 digits
20	0	0	**TerminalNo (= terminal No.)** 3 digits
21	0	0	'Target'
22	0	0	**Target (= target weight)** 8 digits
23	0	0	' '
24	0	0	' '
25	0	0	' '
26	0	0	' '
27	0	0	' '

Total Weight (total weighing printout)

Field	Line	Column	Content
1	1	1	'Date'
2	1	16	**date,** 8 or 10 digits, depending on configuration
3	2	1	'Time'
4	2	16	**time,** 5 or 8 digits, depending on configuration
5	3	1	'Weighings'
6	3	16	**NoOfWeighings (= no. of weighings)** 5 digits
7	4	1	'Total'
8	4	12	**TotalNet (=net total)** 10 digits
9	6	27	**unit** 2 digits
10	0	0	**TotalGross (=gross total)** 10 digits
11	0	0	**unit** 2 digits
12	0	0	**TotalTare (=tare total)** 10 digits
13	0	0	**unit** 2 digits
14	0	0	'Peak'
15	0	0	**sPeakMax (= peak max. of peak-hold function)** 11 digits
16	0	0	**TerminalNo (= terminal No.)** 3 digits
17	0	0	' '
18	0	0	' '
19	0	0	' '
20	0	0	' '
21	0	0	' '

Ticket Count (single count printout)

Field	Line	Column	Content
1	1	1	'Date'
2	1	12	**date,** 8 or 10 digits, depending on configuration
3	2	1	'Time'
4	2	12	**time,** 5 or 8 digits, depending on configuration
5	3	1	'Cons.No.'
6	3	12	**ConsecNo (= consecutive no.)** 5 digits
7	0	0	**alibino (=Ident No.)** 4 or 6 digits
8	4	1	'Gross'
9	4	12	**fgross (=gross weight)** max. 12 digits
10	5	1	'Tare'
11	5	12	**ftare (=tare weight)** max. 12 digits
12	6	1	'Net'
13	6	12	**fnet (=net weight)** max. 12 digits
14	7	1	'Pieceweight(g)'
15	7	16	**Piece_Weight** 10 digits
16	7	27	'g'
17	8	1	'Pieces'
18	8	12	**Count (=no. of pieces)** 8 digits
19	0	0	**gross (=gross weight) 8 digits**
20	0	0	**tare (=tare weight) 8 digits**
21	0	0	**net (=net weight) 8 digits**
22	0	0	**Unit (= weight unit)** 2 digits
23	0	0	**TerminalNo (= terminal No.)** 3 digits
24	0	0	' '
25	0	0	' '
26	0	0	' '
27	0	0	' '
28	0	0	' '

Total Count (total count printout)

Field	Line	Column	Content
1	1	1	'Date'
2	1	12	**date,** 8 or 10 digits, depending on configuration
3	2	1	'Time'
4	2	12	**time,** 5 or 8 digits, depending on configuration
5	3	1	'Weighings'
6	3	12	**NoOfWeighings (= no. of weighings)** 5 digits
7	4	1	'Total pieces'
8	4	12	**TotalCount (= total of pieces)** 8 digits
9	5	1	'Pieceweight'
10	5	16	**Piece_Weight** 10 digits
11	5	27	'g '
12	6	1	'Total'
13	6	16	**TotalNet (=net total)** 10 digits
14	6	27	**unit** 2 digits
15	0	0	**TotalGross (=gross total) 10 digits**
16	0	0	**unit 2 digits**
17	0	0	**TotalTare (=tare total) 10 digits**
18	0	0	**unit 2 digits**
19	0	0	**TerminalNo (= terminal No.)** 3 digits
20	0	0	' '
21	0	0	' '
22	0	0	' '
23	0	0	' '
24	0	0	' '

17 Reset (Application)

With this function values and parameters of the application can be reset to factory settings. The application is reset to *BASIC*. The Service settings parameters remain unchanged.

From the Service Mode menu choose group 'Reset.'

`Reset?  N`	Yes 	Reset application parameters.
	OK 	
`Resetting ...`		Resetting application parameters

Group	Value
Service Mode / Application	Program: *BASIC*
	Start Key: Enabled
	–Zone: Red
	+Zone: Orange
	ok Zone: Green
	Tare Key: Disabled
	Output 0: LT S1
	Output 1: LT S2
	Output 2: LT S2
	Print Mode: Standard
	Auto Tare: N
	Host Port: None
	Print Port: None
	Codepage: None
	Input 0: Capture weight
	Peak Hold: N
Supervisor Mode / Input Parameters	Cons. No.: 1
	1st setpoint: 0
	2nd setpoint: 0
	With Printer: N
	With PC: N
	With Totals: Y
	Preact Correction: N
	Brightness (0–100%): 100%

18 Supervisor Mode (Entry Of Parameters)

The Supervisor Mode is used to enter parameters during running operation. Here also the W&M approved data archive and system information can be viewed.

Call up Supervisor Mode:

	Return  From the basic step of operating sequence of chosen application mode switch to display of version.
IT1 9.99	Display of version, date and time and chosen operating mode.
	Setup  Call up Supervisor Mode
Input Parameters	Select  Basic step of Supervisor Mode

- **Input Parameters**
- **Weight Storage**
- **Software Updates**
- **Software ID**
- **MAC/IP Address**
- **Master Mode**

18.1 Input Parameters

Input Parameters	Continue 
Day 99	Enter date
Month 99	Enter month
Year 99	Enter year
Hour 99	Enter hour
Minute 99	Enter minute
Cons.No. 9999	Enter / change consecutive no. 2 for printout
1st Setpoint 0.0	Enter setpoint S1 (function depending on chosen operating mode):

- ***BASIC*** Threshold S1, either for digital output or automatic printing after scale has settled
- ***COUNT*** Setpoint S1 for digital output
- ***CHECK*** Minus tolerance
- ***CHECK-IN*** Setpoint S1 for next weighing
- ***FILL*** Preact value to calculate cutoff point for filling with fast speed

All operating modes except *CHECK-IN*:

`2nd Setpoint 0.0`

Enter setpoint S2 (function depending on chosen operating mode):

- ***BASIC*** Setpoint S2 for digital output
- ***COUNT*** Setpoint S2 for digital output
- ***CHECK*** Plus tolerance
- ***FILL*** Preact value to calculate cutoff point for filling with slow speed

Operating mode *FILL*:

`Preact Corr.? N`

No  Preact correction disabled

Yes  Preact correction enabled

The value for preact slow S2 (=cutoff point slow-speed feeding) is recalculated with every completed filling cycle and saved. The operator may manually change this value, e.g. to shorten – after change of material – the learning curve that the controller needs to again reach target (usually within 4 filling cycles).

All operating modes except *CHECK-IN* and *ONLINE*:

`With Printer? N`

Enable / disable printer

No  Without printer

Yes  With printer

`With PC? N`

Enable / disable data transmission

No  Without data transmission

Yes  With data transmission

`With Totals? Y`

Enable / disable summing

No  Without summing

Yes  With summing (normal operation)

`Brightness 100%`

Set display brightness (min. = 40 %)

-10%  Decrease brightness by 10 %

+10%  Increase brightness by 10 %

18.2 Weight Storage

Note: For the W&M approved weight storage (data archive) installation of an ASM module is required.

The data archive has a capacity of 1,000,000 entries. A record is stored for every completed weighing cycle in the internal W&M approved data archive consisting of weight, date and Id No. The sequence of a weighing transaction is: weighing / data entry, entry in data archive, printing and data transmission.

In the archive each record is stored with date, ident No. and gross and net weight. The Id No. is reset to 1 with every change of the date if the data archive has been configured to 'Date+Id.' To allow for a later verification of the weighing data, date and identification No. of the weighing have to appear on the printout or must be stored together with the weight on the host computer.

The data archive can be used as an alternative to a log printer when data are processed in an EDP system. The stored weights are read-only and cannot be deleted or changed.

```
Weight Storage
```

Continue 

'With Printer? = Y'

```
Select Function
```

Show  Show data archive info

Print  Print stored weights

18.2.1 View Stored Records

```
Day                 99
```

Enter date of weighing

```
Month               99
```

Enter month

```
Year                99
```

Enter year

```
ID          9999999999
```

Enter ID of record that is to be looked up.

```
W1     99.99.99    ID 99
9.9 kg N           9.9 kg
```

Display of:

- **Scale**
- **Date**
- **ID**
- **Net weight (N)**
- **Tare weight**

Prev  Back to previous record.

Next  Proceed to next record.

Continue  Return to step '`Day`'

A matching record could not be found in the data archive:

Not found	Prev 	Back to previous record
	Next 	Proceed to next record

An error was detected in the checksum of the data archive.

Error Checksum!	Important note: The stored data are void!

18.2.2 Print Stored Weights

From day 99	Enter day of first record to be printed
From month 99	Enter month of first record to be printed
From year 99	Enter year of first record to be printed
To day 99	Enter day of last record to be printed
To month 99	Enter month of last record to be printed
To year 99	Enter year
Printing...	Print records

Matching records could not be found in the data archive for the specified period of time:

Not found!	Return to step 'From day'

An error was detected in the checksum of the data archive.

Error Checksum!	Important note: The stored data are void!

18.3 Software Updates

All firmware updates can be traced and viewed in the 'Software Updates' menu (logbook). It is read only and cannot be changed or deleted. A record shows the consecutive number of the update, the file name and date and time of the installation. The record at top is the most recent one.

Software Updates	Continue 	Basic step of Supervisor Mode.
1 Update_99999999.9	--> 	Show next step.
installed at 9999-99	--> 	Show next step.
-99 99:99		
	Continue 	Continue with older record.
	Return 	Return to previous record or back to step 'Software Updates.'

18.4 Software ID

Software ID	Continue 	Basic step of Supervisor Mode.
ID:15487782/V4.14.20		Display of identification No. of operating system and version of approved software.
	Return 	Return to step 'Software ID'

18.5 MAC/IP Address

MAC/IP Address	Continue 	Basic step of Supervisor Mode
MAC: 99:99:99:99:99:	Select 	Display of MAC address
IP: 10.0.0.9		Display of IP address
Serial No 9999999999		Serial No. of device
	Return 	Return to step 'MAC/IP Address'

18.6 Master Mode

For a description of the Master Mode, refer to the respective calibration manual:

- Calibration Manual IT1/IT3 ADM/DADM, order No. ST.2309.1771
- Calibration Manual IT1/IT3 Digital Scale Connection, order No. ST.2309.1781
- Calibration Manual IT1/IT3 IDNet MultiRange, order No. ST.2309.1776

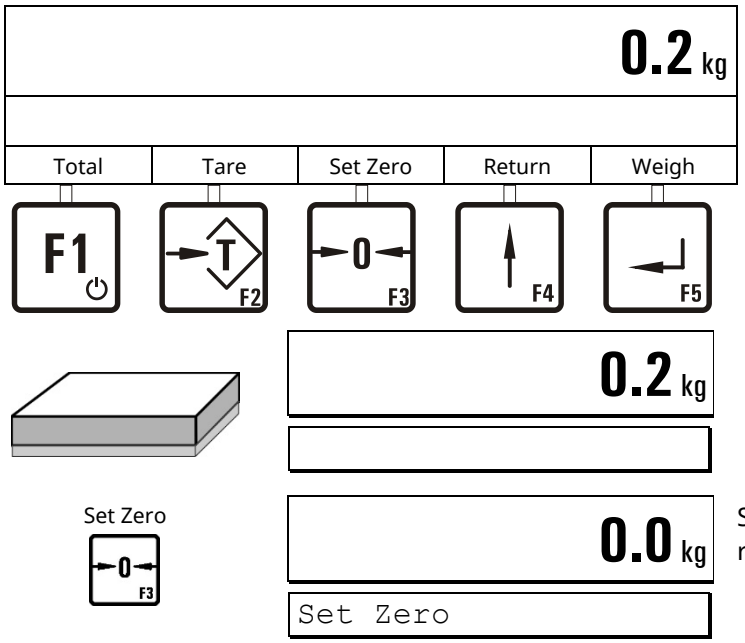
19 Operating Modes

19.1 Weighing Functions

The basic step for all operating modes is the display of the weight. In this step the elementary scale functions are accessible.

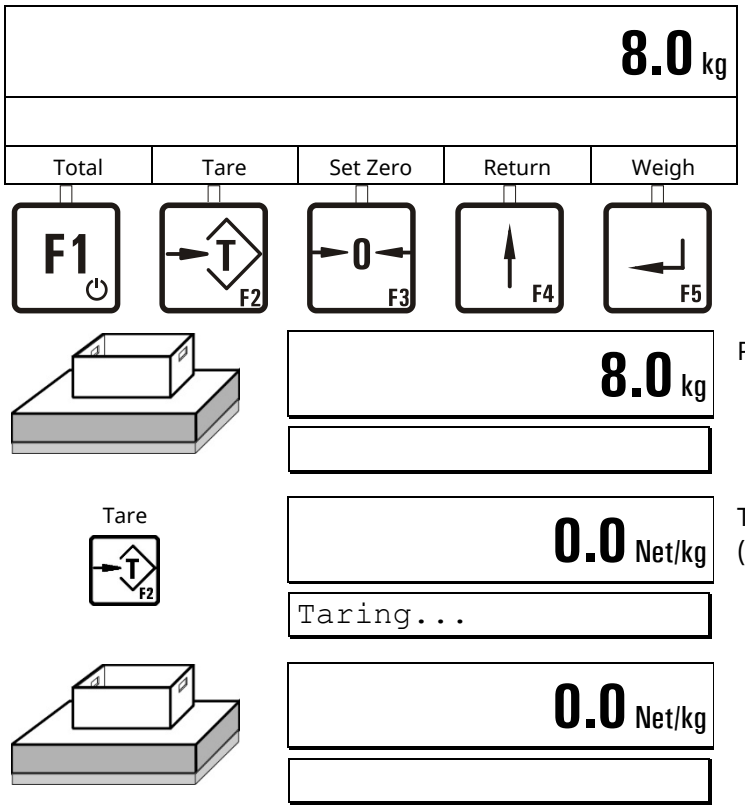
For the sequences described below Service Mode settings are required as follows: 'Print mode: Standard,' 'Auto Tare?=N' and 'Peak Hold?=N' (operating mode *BASIC*).
See section 'Print mode,' 'Auto Tare' and 'Peak Hold.'

19.1.1 Zero Setting



Set gross weight to zero (only within selected range for pushbutton zero)

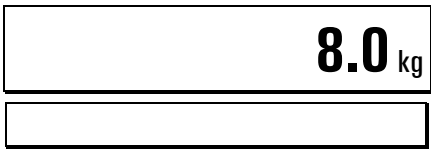
19.1.2 Taring



Put container on scale.

Tare scale
(Net is shown for net weight)

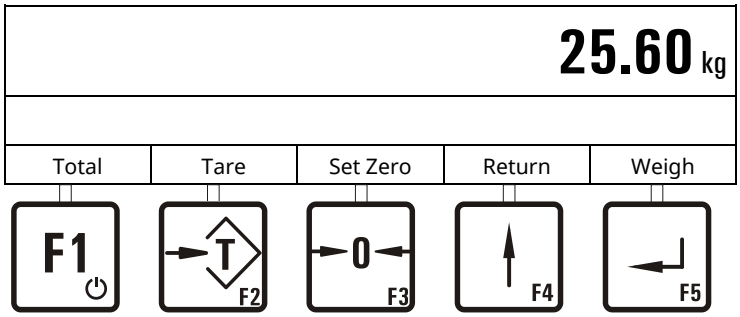
Tare

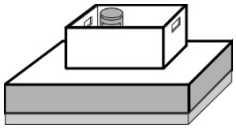


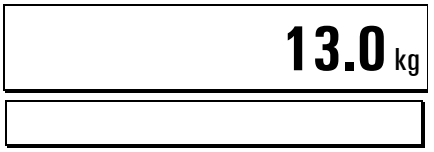
Clear tare and return to display of gross weight.

Note: Only for 'Tare mode: Gross/Net' (see 'Tare functions').

19.1.3 Weighing

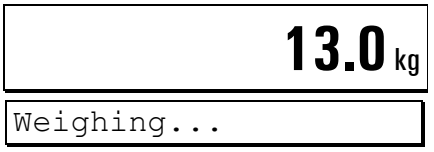






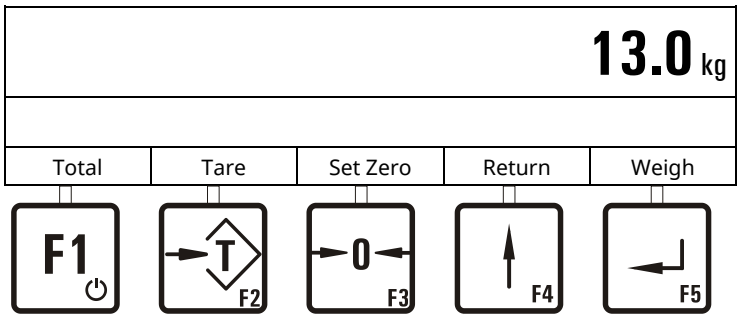
Put items into container.

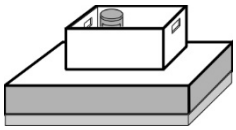
Weigh

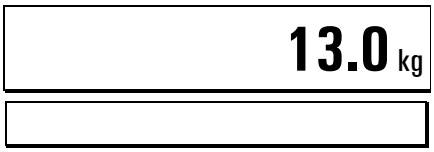


Output weight on printer and/or transmit to host.

19.1.4 Show Weight With Tenfold Resolution

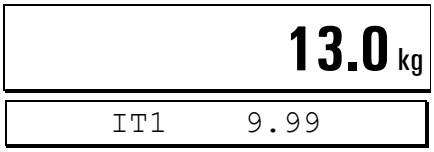






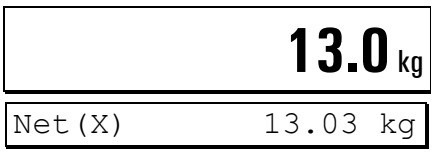
Display of gross weight

Return



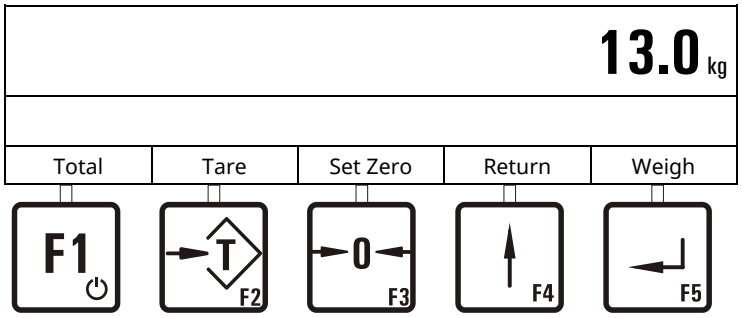
From basic step of chosen operating mode switch to display of version message.

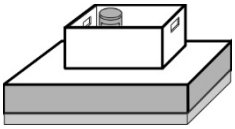
Net (X)



Show current weight with tenfold resolution.
Display is switched back after 5 sec.

19.1.5 Switch Weight Unit





13.0 kg

Display of gross weight

Return

13.0 kg

IT1 9.99

From basic step switch to display of version message.

kg / lb / **oz** ...

460 oz

Press repeatedly to select unit. Display of weight in chosen unit.

Notes:

- additional loadable update required
- not permitted for W&M approved applications in the EC

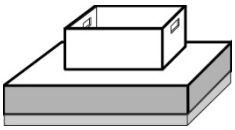
19.2 Tare Functions

In the Service Mode, Group 'General' different tare modes can be chosen.

The sequence depends on the settings in Service Mode: 'Print mode: Standard' and 'Auto Tare?=N' (operating mode *BASIC*).
See chapter 'Print mode' and 'Auto Tare.'

19.2.1 Set / Clear Tare (Tare mode: Gross/Net)

With each actuation of the tare key the display is switched from gross to net and back. This is the usual tare function which is appropriate for most applications.



8.0 kg

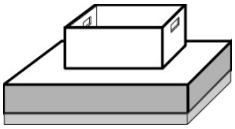
Put container on scale.

Tare

0.0 Net/kg

Taring...

Tare scale
(Net is shown for net weight)



0.0 Net/kg

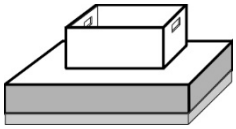
Tare

8.0 kg	Clear tare and return to display of gross weight.

19.2.2 Clear Tare Automatically (Tare mode: Auto clear)

The loaded scale can be tared only once, and the net display is automatically switched back to gross when the scale returns to the zero range.

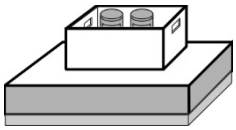
This function is useful for serial weighings with changing tare weight.



8.0 kg	Put container on scale.

Tare

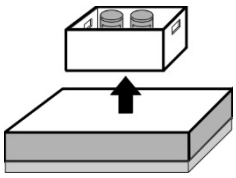
0.0 Net/kg	Tare scale (Net is shown for net weight)
Taring...	



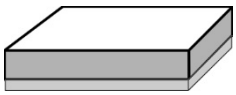
13.0 Net/kg	Put item(s) into container.

Weigh

13.0 Net/kg	Output weight on printer and/or transmit to host.
Weighing...	



–8.0 Net/kg	Remove filled container from scale.

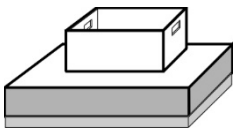


0.0 kg	Tare is automatically cleared.

19.2.3 Repetitive Tare (Tare mode: Net=0)

With each actuation of the tare key the scale is tared anew and the display shows the net weight. If the scale is completely unloaded, tare is automatically cleared and the display is switched back to gross weight.

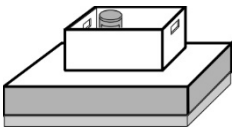
This function is used to subsequently fill several components into one container.



8.0 kg	Put container on scale.

Tare

0.0 Net/kg	Tare scale (Net is shown for net weight)
Taring...	



13.0 Net/kg

Put first item into container.

Weigh

13.0 Net/kg

Weighing...

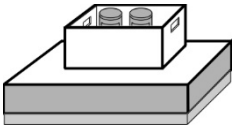
Output weight on printer and/or transmit to host.

Tare

13.0 Net/kg

Taring...

Tare scale anew.



13.0 Net/kg

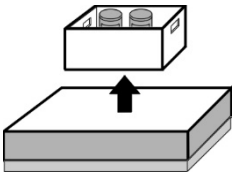
Put second item into container.

Weigh

13.0 Net/kg

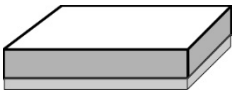
Weighing...

Output weight on printer and/or transmit to host.



–8.0 Net/kg

Remove filled container from scale.



0.0 kg

Tare is automatically cleared.

19.3 Print mode

In the group 'Application' of the Service Mode the function of the ↵ **-key** (or the corresponding digital input) can be configured for the operating mode *BASIC*.

- **Standard**
  Standard function of ↵ **-key** and the corresponding digital input
- **Auto**
  Automatic print release when weight of first setpoint S1 is exceeded.
- **Once**
  Printing once by pressing the ↵ **-key** or activating the digital input. The next print can only be released after the scale has been unloaded or the weight has fallen below setpoint S1.

19.4 Auto Tare

In the group 'Application' of the Service Mode automatic taring can be enabled for operating mode *BASIC*.

- Automatic taring when Gross > S1 and Gross < S2.
- Tare is automatically cleared when the scale has settled and the weight has fallen below setpoint S1.

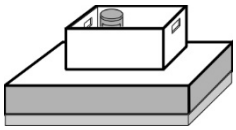
19.5 Peak Hold

In the group 'Application' of the Service Mode automatic saving and display of last net-weight peak can be enabled for operating mode *BASIC*. The display can be turned on/off and cleared manually by the operator.

Activate Display

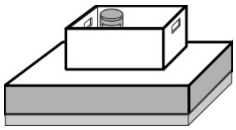
Notes:

- The peak display must be activated by the operator each time the terminal is started.
- The net peak value is continuously saved in the background even if the peak display has not been activated.



	13.0 kg	Display of gross weight
Return F4	13.0 kg IT1 9.99	From basic step of chosen operating mode switch to display of version message.
Peak On F2	13.0 kg Peak value: 25.6 kg	Activate display of last net-weight peak.

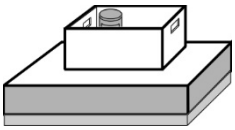
Reset Peak Value



	13.0 kg Peak value: 25.6 kg	Display of gross weight
Return F4	13.0 kg IT1 9.99	From basic step of chosen operating mode switch to display of version message.
Peak Clr F4	13.0 kg Peak value: 13.0 kg	Reset net-weight peak value

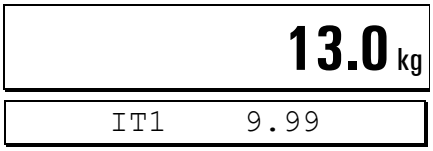
Deactivate Display

Note: The net peak value is continuously saved in the background even if the peak display has not been activated.



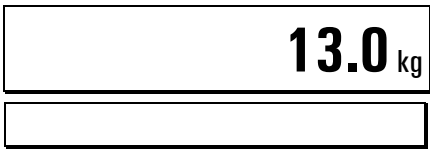
Display of gross weight

Return



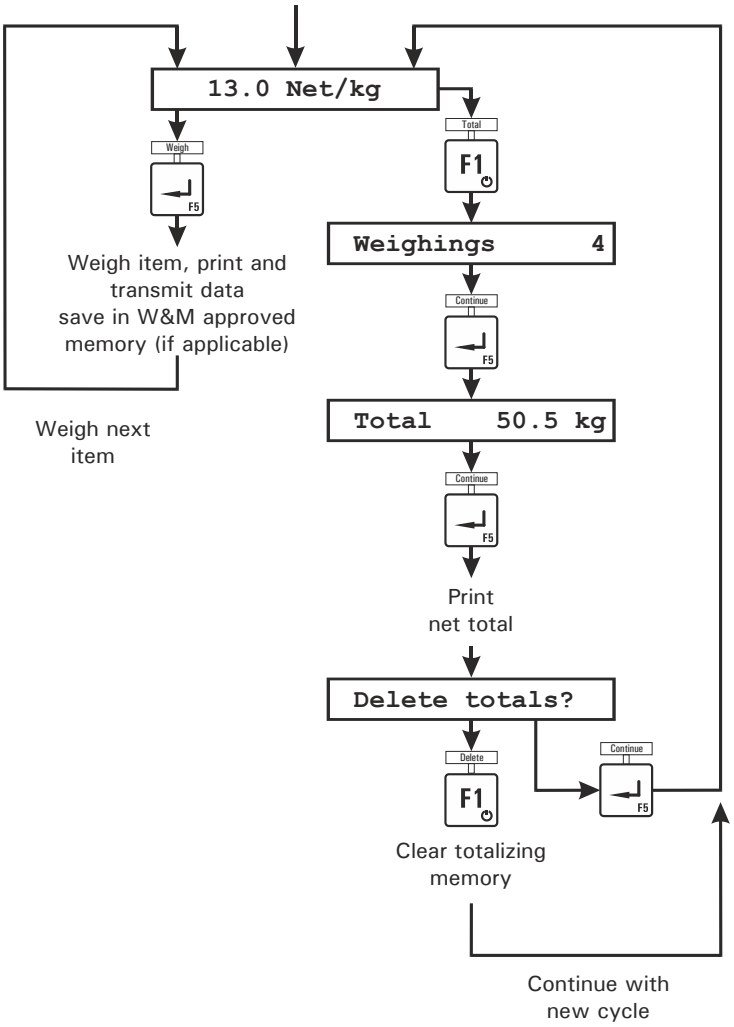
From basic step of chosen operating mode switch to display of version message.

Peak Off



Deactivate display of net-weight peak.

19.6 Operating Mode *BASIC*



- Comparison of weight and control of the outputs A0 and A1 is active in the background, independently of data entry and printing. Configuration of the outputs is made under 'Service Mode\Application.'
- The inputs E0 and E1 work in parallel to the function keys as configured in the group 'Application/Input 0' of the Service Mode:

Input 0 = Capture Weight:		
F5	Signal Start / capture weight and totalize	rising edge E0
T F2	Signal Taring	rising edge E1

Input 0 = Set zero:		
0 F3	Signal Set zero	rising edge E0
T F2	Signal Taring	rising edge E1

- The setpoints S1 and S2 can be configured in the Supervisor Mode for a tolerance check (see chapter 'Input Parameters').
- If an incline sensor is connected, the input E1 is not available for other functions.
- The function 'Totalizing' can be disabled in Supervisor Mode in the step 'With Totals? = N.'

19.6.1 Display Of Barcode/QR Code

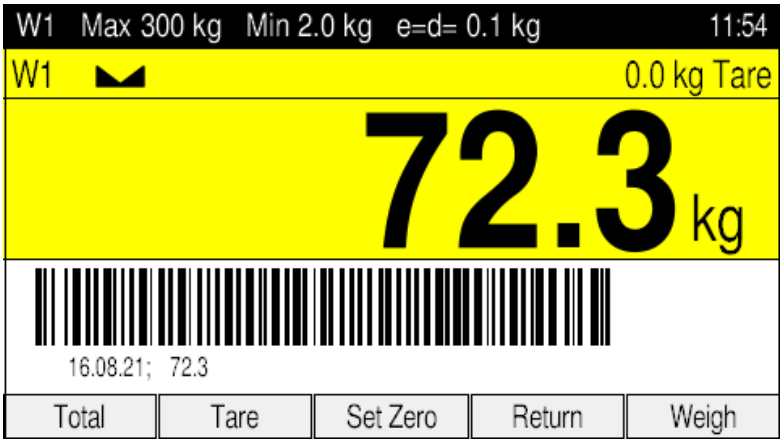
In Service Mode, group 'Application', the display of a barcode (Code 128) or a QR code can be activated in the operating mode *BASIC*. The content of the barcode/QR code is configurable.

By selecting from a list of variables, a maximum of 7 content fields can be configured, e.g. date, time, gross weight, net weight, etc. Depending on the configuration, the weight values can be displayed as purely numerical values or as formatted data with unit sign. Likewise, the semicolon separator between the individual fields of the barcode/QR code can be activated.

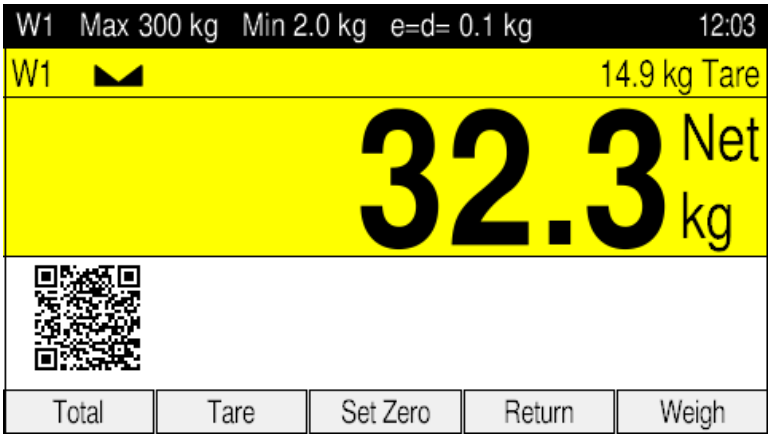
If the barcode/QR code does not contain an ID number, the display is only shown when the scale is settled and only as long as it remains settled. As soon as the scale is in motion, the display is deleted again.

If the ID number has been configured as part of the barcode, then the barcode/QR code is only displayed after a weighing cycle has been triggered by pressing the ENTER key or via the IN0 digital input. The barcode/QR code is displayed unchanged for the duration of an adjustable time (1-30 seconds), then deleted again.

Example: Code 128 for date and net weight

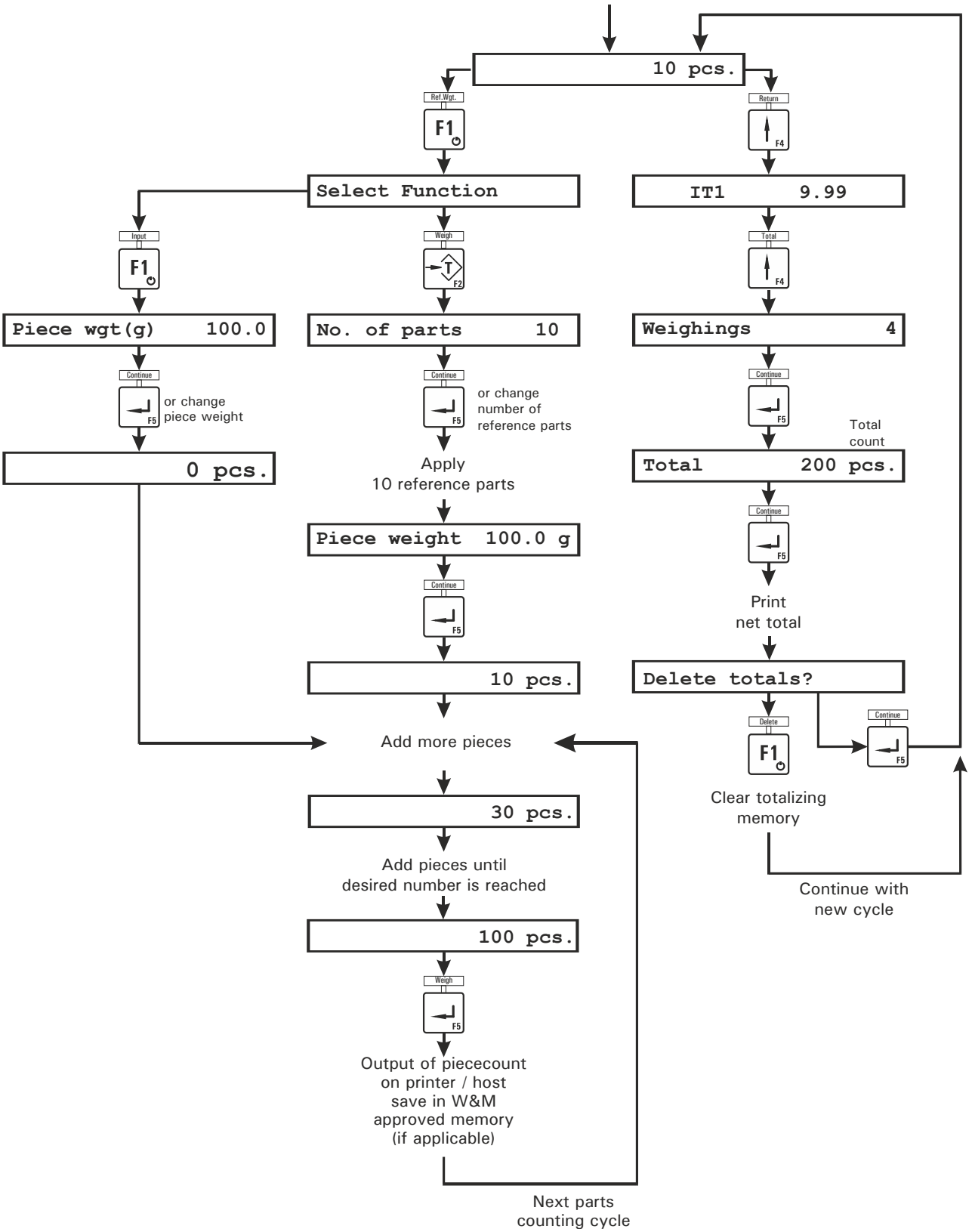


Example: QR code with date, time, gross, tare, net, scale No., ID No.



Note: The display of a barcode or QR code requires an additional firmware update, which may need to be downloaded, if applicable.

19.7 Operating Mode *COUNT*



- The reference weight can be entered by the user or obtained by weighing reference parts. If weighing of reference parts is chosen, the program automatically optimizes the average piece weight. This ensures maximum accuracy for the counting cycle.
- If too many parts are placed on the scale, optimization is not possible and an error message is shown.
- By default the number of reference parts is 10, but it can be changed freely by the operator.

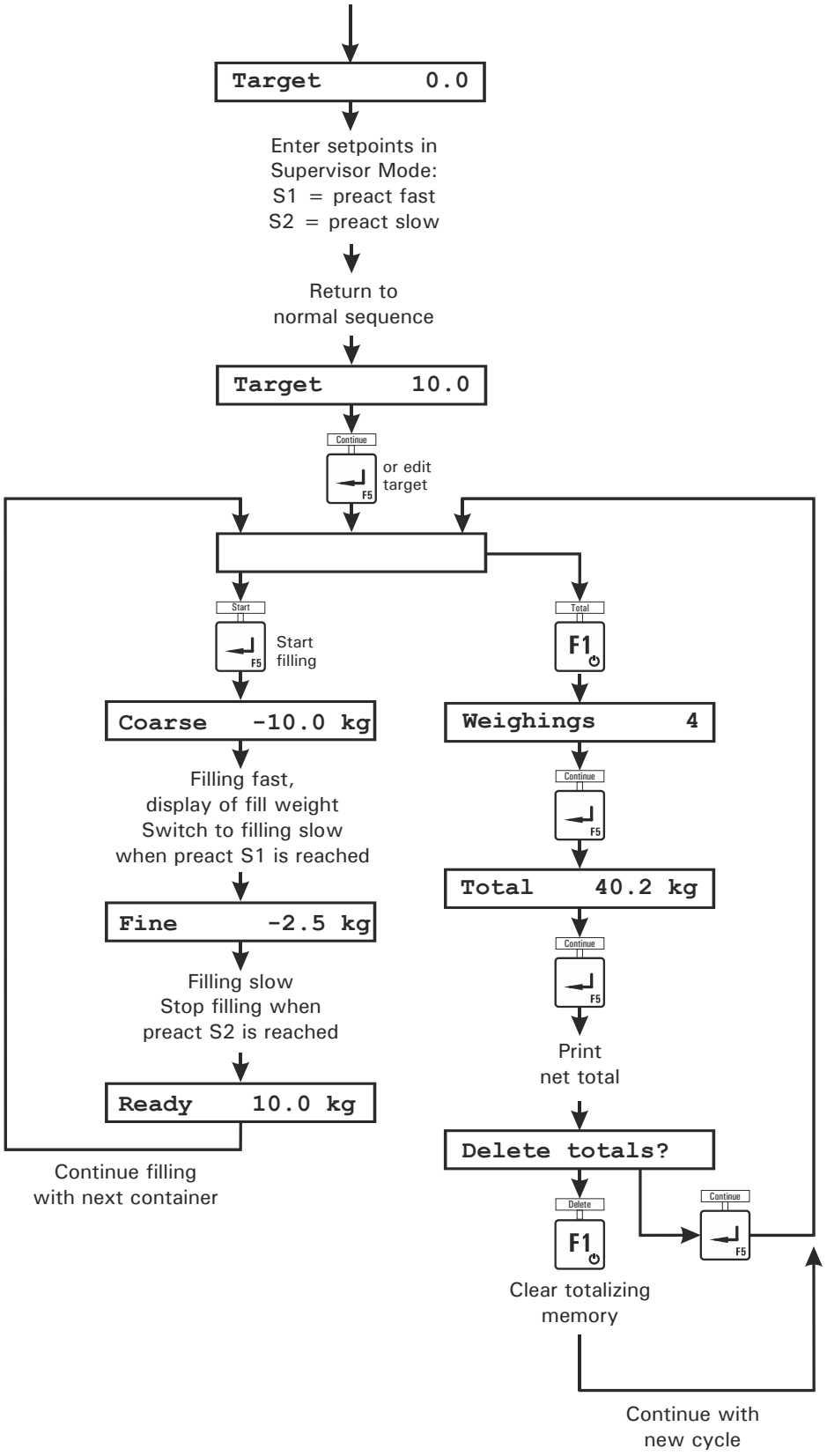
- Both, counting into an empty container or counting out of a filled one, are possible.
- Comparison of weight and control of the outputs A0 and A1 is active in the background, independently of data entry and printing. Configuration of the outputs is made under 'Service Mode\Application.'
- The inputs E0 and E1 work in parallel to the function keys as configured in the group 'Application/Input 0' of the Service Mode:

Input 0 = Capture Weight:		
	Signal Capture weight and totalize	rising edge E0
	Signal Taring	rising edge E1

Input 0 = Set zero:		
	Signal Set zero	rising edge E0
	Signal Taring	rising edge E1

- The setpoints S1 and S2 can be configured in the Supervisor Mode for a tolerance check (see chapter 'Input Parameters').
- If an incline sensor is connected, the input E1 is not available for other functions.
- The function 'Totalizing' can be disabled in Supervisor Mode in the step 'With Totals? = N.'

19.8 Operating Mode *FILL*



- Output A0 controls filling fast.
  Output A1 controls filling slow.
- Inputs E0 and E1 can be used in parallel to the function keys as follows:

Signal Start rising edge E0

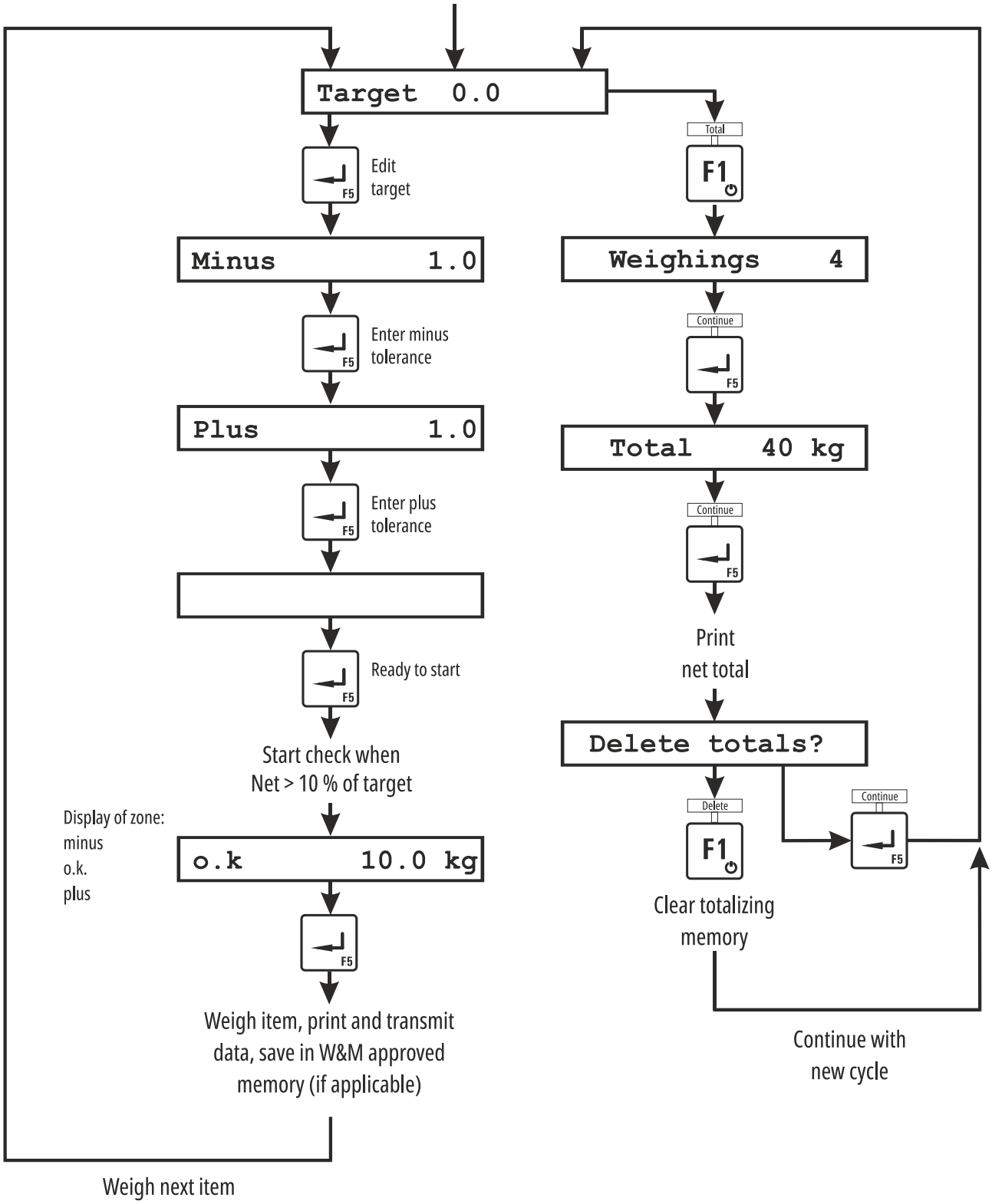
Signal Interrupt as long as E1 is on

- The target weight is entered as input step in the operating sequence.
- If parameter 'Start Key: Disabled' is set in Service Mode, start with ↵ **-key** is disabled and cycle can only be started via input E0.
- The weight must be acknowledged after every filling when parameter 'Ack. filled weight: Y' is set in Service Mode. The weight value is stored and printed after acknowledgement.
- The two setpoints S1 and S2 are used for the calculation of the fast / slow setpoint (S1) and the preact for the in-flight compensation (S2). These values are subtracted from the target value.
- Weight and target are compared as absolute (unsigned) values, thus it is possible to fill empty containers or to withdraw material from filled – or partially filled – ones.
- If an incline sensor is connected, the input E1 is not available for other functions.
- The function 'Totalizing' can be disabled in Supervisor Mode in the step 'With Totals? = N.'
- **Preact correction:** If the automatic trend-sensing preact correction is enabled in Supervisor Mode, the value for preact slow S2 (=cutoff point slow-speed feeding) is recalculated with every completed filling cycle and saved. The operator may manually change this value, e.g. to shorten – after change of material – the learning curve that the controller needs to again reach target (usually within 4 filling cycles).

Overview setpoint settings:

	Example		Target weight: 100 kg
Setting	S1 (fast)	S2 (slow)	Filling sequence
S1 greater S2	20	5	• up to 80 kg filling fast speed (output A0 ON) • up to 95 kg filling slow speed (output A0 OFF, A1 ON) • material in flight up to 100 kg (output A0 OFF, A1 OFF)
S2 = 0	20	0	• up to 80 kg filling fast speed (output A0 ON) • up to 100 kg filling slow speed(output A0 OFF, A1 ON) (preact for in-flight compensation disabled)
S2 greater or equal S1	20	≥ 20	• up to 80 kg filling fast speed (output A0 ON) • material in flight up to 100 kg (filling slow is disabled, filling is only controlled via output A0)

19.9 Operating Mode CHECK



- Minus threshold = target – setpoint S1
  Plus threshold = target + setpoint S2
- Output A0 is used to indicate the result 'Weight ok'
- Output A1 is used to indicate the result 'Out of tolerance'
- The inputs E0 and E1 work in parallel to the function keys as configured in the group 'Application/Input 0' of the Service Mode:

Input 0 = Capture Weight:		
	Capturing and totalizing	rising edge E0
	Signal Taring	rising edge E1

Input 0 = Set zero:		
	Signal Set zero	rising edge E0
	Signal Taring	rising edge E1

- A checkweighing cycle is started when the scale is loaded with more than 10 % of target weight. The output signal and the display color corresponding to the result of the check are set continuously (parameters '– Zone,' '+ Zone' and 'ok Zone' in menu 'Select: Application'). All output signals are reset when the weight falls below the threshold of 10 % of target, e.g. the test object is removed from the scale. Then a new cycle can be started.
- If an incline sensor is connected, the input E1 is not available for other functions.
- The function 'Totalizing' can be disabled in Supervisor Mode in the step 'With Totals? = N.'

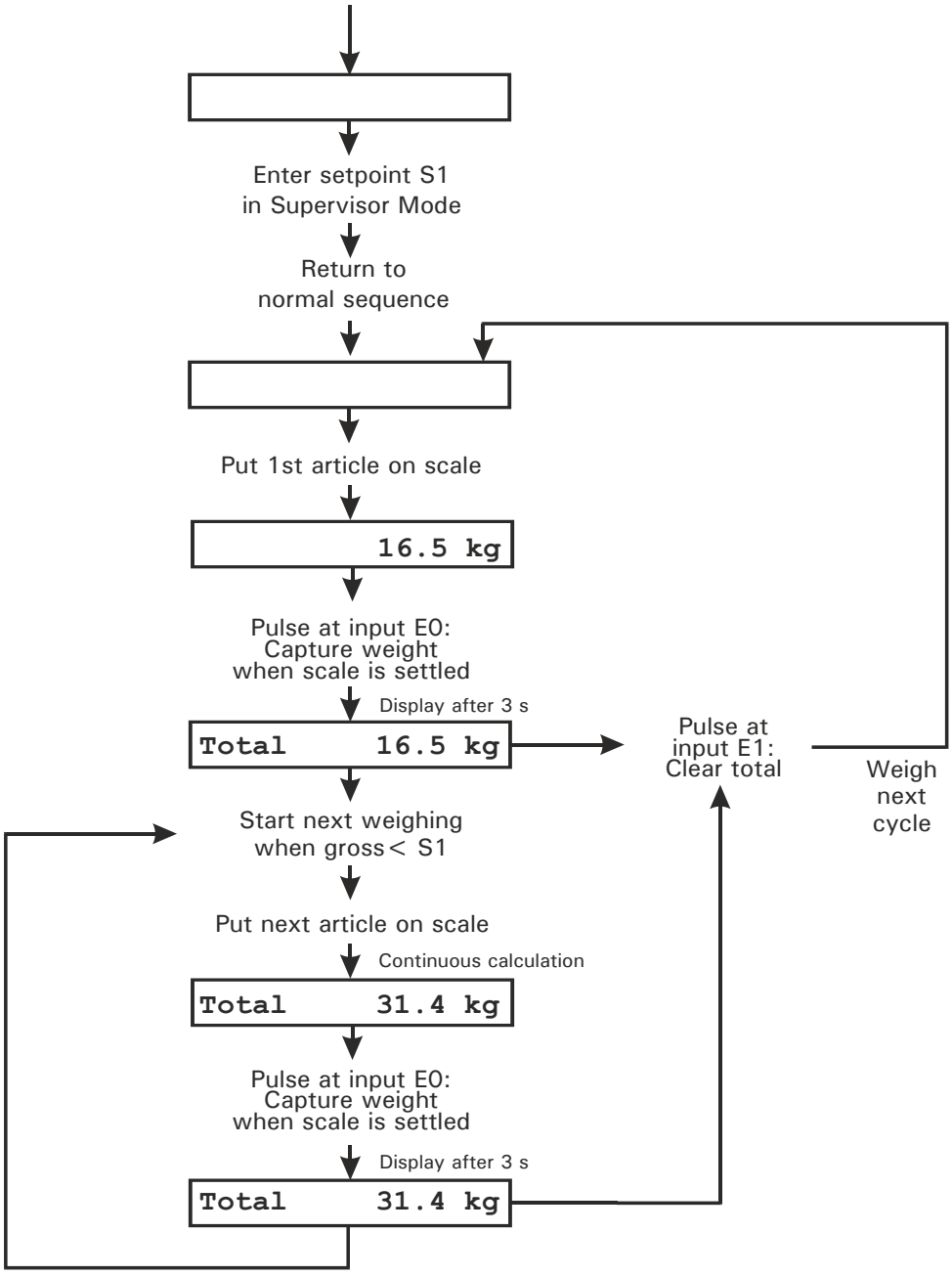
When the following settings are made in the menu 'Service Mode\Service\Config. Digital IO':

- Group1: REL/TRIO
  or
- Group1: PIM
  Group2: SIO, REL/TRIO

the I/O assignment changes:

- Output A0 is used to indicate the status '—weight '
- Output A1 is used to indicate the status 'weight OK'
- Output A2 is used to indicate the status '+ weight'
- Input E0 = Zero setting when gross weight < 0, or
  Taring when gross weight > 0.
  The input takes only effect when the scale is settled! The configuration of the group 'Application/Input 0' of the Service Mode does not apply.
- Setpoint 1 = Minus tolerance, setpoint 2 = Plus tolerance.

19.10 Operating mode *CHECK-IN*



- The registration starts when the input E0 is set. The weight is registered and displayed after 3 seconds when the scale is settled.
- Minimum load = setpoint S1
- Output A0 is used to indicate the status 'Scale ready.'
  The output is reset during weight capturing.
- Output A1 is not used.
- The operating mode uses only the inputs E0 and E1 (e.g. via external pushbuttons) to control the sequence.
- Assignment of the inputs:
  E0 = Capture weight and totalize (article on scale)
  E1 = Clear total (next weigh cycle)
- The next weighing is started when the weight falls below setpoint S1. E0 has to be set again.
- The total weight is cleared when the input E1 is set. The program proceeds with the next weighing cycle.

20 *ONLINE* Mode SysTec Standard

In the operating mode *ONLINE* the weighing terminal is controlled remotely from a PC via the optional serial interface or Ethernet.

The *ONLINE* commands are also available in Supervisor Mode (see below).

ONLINE communication is terminated when the Service Mode is called up and restarts automatically when the Service Mode is terminated.

The tare key for operating mode *ONLINE* can be enabled or disabled in Service Mode group 'Select: Application.'

The complete keyboard can be locked by switching on input E0 or E1, if the input has been selected for keyboard locking in the group 'Select: Application' of the Service Mode. The keyboard remains locked as long as the input is switched on. If no input has been selected for the keylock in Service Mode (setting 'Keylock input: off') or if the selected input is switched off, then the complete keyboard can be locked or unlocked via the online command LK.

20.1 Structure Of Data Strings

Each data string from the PC to the weighing terminal consists at least of a 2-digit command. Several data strings contain additional parameters and/or data. The character set used is ISO 8859.

Structure of data strings without separation character:

Data string PC → Weighing terminal

<	*Command*	*Parameter*	*Data*	>

Data string weighing terminal → PC:

<	*Error code*	*Data*	>	CR	LF

Structure of data strings with separation character:

Data string PC → Weighing terminal

<	*Command*	*Separator*	*Parameter*	*Separator*	*Data*	>

Data string weighing terminal → PC:

<	*Error code*	*Separator*	*Data*	>	CR	LF

Note:

- To separate individual data in the response string (**IT1 → PC**) by a separator, the separator must be sent in the command string (**PC → IT1**) at the appropriate position.
- For a list of separators, refer to the section **'Separators'**.
- For a list of error codes, refer to section **'Error Codes'.**
- It cannot be ensured that over an Ethernet connection the response string is transmitted in a single TCP/IP packet. Therefore the control character CR LF can optionally be disabled in the Service Mode group 'Select: Application', setting 'Response with CR/LF.'

20.2 Overview Commands

Command	Description	Example
RN	Read Weight (no motion)	**RN1**
RM	Read Weight (in motion)	**RM1**
TA	Automatic Tare	**TA1**
TM	Manual Tare	**TM000056.71**
TC	Clear Tare	**TC1**
SZ	Set Scale To Zero	**SZ1**
ST	Set date and Time	**ST20.03.1708:10:23**
SP	Set SetPoints	**SP2100.5**
GI	Get digital Input	**GI**
OS	Set digital Output	**OS01**
OC	Clear digital Outputs	**OC01**
DC	Set background color	**DC2**
LK	Lock keyboard	**LK1**

20.3 Read Weight

RN Read Weight (no motion)

The RN command reads a settled weight.

Note: IT1 supports one scale understructure only. Thus, the scale No. included in the command is ignored. The scale No. returned in the IT1 data string is always '1.'

If the scale is settled the gross, net and tare weights are returned to the host along with current date and time and ID-number. If a settled weight cannot be obtained within 6 seconds, the RN command is aborted and error code <13> is returned instead.

If the gross weight is negative, the RN command is aborted and error code <20> is returned instead.

Note: 'Settled' means that consecutive weight readings do not differ more than specified in the scale calibration (motion window).

Command

Field	Byte	Char's	Description	Example
RN	1	2	Command	**RN**
Separator	3	1	Optional *	**;**
Scale No.	4	1	Optional	**1**
	In total:	4	3 (without separator)	

* The separator sent with the command is returned by the weighing terminal in the response string.

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table 'Error Codes'	**00**
Separator	3	1	[1)]	**;**
Scale status	4	2	First digit: always 0 (scale settled) Second digit: 0 = gross positive 2 = gross in zero range	**00**
Separator	6	1	[1)]	**;**

Field	Byte	Char's	Description	Example
Date	7	8/10	Date, format as per configuration	**02.05.05**
Separator	17	1	[1]	**;**
Time	18	5/8	Time (format HH:MM)	**14:30**
Separator	26	1	[1]	**;**
Ident No.	27	4 [2]	Ident number (non-significant digits are transmitted as space character)	**___1**
Separator	31	1	[1]	**;**
Scale No.	32	1	For IT1 always 1	**1**
Separator	33	1	[1]	**;**
Gross	34	8	Formatted as per configuration (non-significant digits are transmitted as space character)	**__430.00**
Separator	42	1	[1]	**;**
Tare	43	8	Formatted as per configuration (non-significant digits are transmitted as space character)	**___30.00**
Separator	51	1	[1]	**;**
Net	52	8	Formatted as per configuration (non-significant digits are transmitted as space character)	**__400.00**
Separator	60	1	[1]	**;**
Unit	61	2	kg, g , t or lb, for g and t: _ = second character is space	**g_**
Separator	63	1	[1]	**;**
Tare code	64	2	PT = Preset Tare _T = Auto-tare __ = scale not tared (_ = space character)	**PT**
Separator	66	1	[1]	**;**
Weighing range	67	1	Weighing range only for multiple-range scales, otherwise space characters	**2**
Separator	68	1	[1]	**;**
Terminal No.	69	3	As entered in Service Mode, group 'Network'	**001**
Separator	72	1	[1]	**;**
Checksum	73	8	CRC16 checksum (non-significant digits are transmitted as space character)	**___45678**

In total: 75–82 62–69 (without separator)

[1] The separator sent with the command is returned by the weighing terminal in the response string.

[2] If the data archive type 'Cons. Id' was chosen in Service Mode under 'Reset\Reset Approved Wgt.' the returned Ident No. has always 6 characters. In this case, the following fields are shifted by 2 characters.

Note: When operating without separator, the date is always transmitted with 8 digits and the time with 5 digits.

RM Read Weight (in motion)

The RM command returns the weight immediately after receipt, even if the scale is in motion. The status bytes indicate whether the scale was settled or not.

The identification No. in the response data string is '0.'

Command

Field	Byte	Char's	Description	Example
RM	1	2	Command	**RM**
Separator	3	1	Optional *	**;**
Scale No.	4	1	Optional	**1**
	In total:	4	3 (without separator)	

* The separator sent with the command is returned by the weighing terminal in the response string.

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table 'Error Codes'	**00**
Separator	3	1	[1]	**;**
Scale status	4	2	First digit: 0 = scale settled 1 = scale in motion Second digit: 0 = gross positive 1 = gross negative 2 = gross in zero range	**00**
Separator	6	1	[1]	**;**
Date	7	8/10	Date, format as per configuration	**02.05.05**
Separator	17	1	[1]	**;**
Time	18	5/8	Time (format HH:MM)	**14:30**
Separator	26	1	[1]	**;**
Ident No.	27	4 [2]	Always 0 (non-significant digits are transmitted as space character)	**___0**
Separator	31	1	[1]	**;**
Scale No.	32	1	For IT1 always 1	**1**
Separator	33	1	[1]	**;**
Gross	34	8	Formatted as per configuration (non-significant digits are transmitted as space character)	**__430.00**
Separator	42	1	[1]	**;**
Tare	43	8	Formatted as per configuration (non-significant digits are transmitted as space character)	**___30.00**
Separator	51	1	[1]	**;**
Net	52	8	Formatted as per configuration (non-significant digits are transmitted as space character)	**__400.00**
Separator	60	1	[1]	**;**
Unit	61	2	kg, g , t or lb, for g and t: _ = second character is space	**g_**
Separator	63	1	[1]	**;**

Field	Byte	Char's	Description	Example
Tare code	64	2	PT = Preset Tare _T = Auto-tare __ = scale not tared (_ = space character)	**PT**
Separator	66	1	[1)]	**;**
Weighing range	67	1	Weighing range only for multiple-range scales, otherwise space characters	**2**
Separator	68	1	[1)]	**;**
Terminal No.	69	3	As entered in Service Mode, group 'Network'	**001**
Separator	72	1	[1)]	**;**
Checksum	73	8	CRC16 checksum (non-significant digits are transmitted as space character)	___**45678**
	In total:	75–82	62–69 (without separator)	

[1)] The separator sent with the command is returned by the weighing terminal in the response string.

[2)] If the data archive type 'Cons. Id' was chosen in Service Mode under 'Reset\Reset Approved Wgt.' the returned Ident No. has always 6 characters. In this case, the following fields are shifted by 2 characters.

Note: When operating without separator, the date is always transmitted with 8 digits and the time with 5 digits.

20.4 Taring

TA Automatic Tare

The TA command performs automatic taring.

Automatic taring is possible only if scale is settled and gross weight is positive. If no-motion cannot be detected within 6 seconds, the command is aborted and error code <15> is returned to the host. If required the host must then repeat the command.

Command

Field	Byte	Char's	Description	Example
TA	1	2	Command	**TA**
Separator	3	1	Optional	**;**
Scale No.	4	1	Optional	**1**
	In total:	4	3 (without separator)	

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table 'Error Codes'	**00**
	In total:	2		

TM Manual Tare

The TM command is used to tare the scale with a value transferred from the host computer.
The tare value may include a decimal point or comma. The terminal rounds the tare value to the increment size of the scale. If the tare value exceeds the weighing range of the scale, error code <15> is returned to the host.

Command

Field	Byte	Char's	Description	Example
TM	1	2	Command	**TM**
Separator	3	1	Optional	**;**
Tare Value	4	8	with decimal point or comma	**000056,71**
Separator	12	1	Optional	**;**
Scale No.	13	1	Optional	**1**
	In total:	13	11 (without separator)	

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table 'Error Codes'	**00**
	In total:	2		

TC Clear Tare

The tare is cleared and the scale is set to gross mode. The IT1 always returns <00>.

Command

Field	Byte	Char's	Description	Example
TC	1	2	Command	**TC**
Separator	3	1	Optional	**;**
Scale No.	4	1	Optional	**1**
	In total:	4	3 (without separator)	

Response

Field	Byte	Char's	Description	Example
Error Code	1	2	always 00	**00**
	In total:	2		

20.5 Set Scale To Zero

SZ Set Scale To Zero

The scale is set to gross zero. Zero setting is only possible if scale is within zero range. The IT1 returns error code <00> when the command could be carried out correctly, if this is not the case, error code <15> is returned instead.

Command

Field	Byte	Char's	Description	Example
SZ	1	2	Command	**SZ**
Separator	3	1	Optional	**;**
Scale No.	4	1	Optional	**1**
	In total:	4	3 (without separator)	

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no errors 15 = error, see table 'Error codes'	**00**

In total: 2

20.6 Set Date And Time

ST Set Date And Time

Command

Field	Byte	Char's	Description	Example
ST	1	2	Command	**ST**
Separator	3	1	Optional	**;**
Date	4	8	DD.MM.YY	**3/20/2017**
Separator	12	1	Optional	**;**
Time	13	8	HH:MM:SS	**08:10:23**

In total: 20 18 (without separator)

Response

Field	Byte	Char's	Description	Example
Error code	1	2	always 00	**00**

In total: 2

20.7 Set Setpoints

SP Set Setpoints

Sets the value for setpoint 1 or 2.

Command

Field	Byte	Char's	Description	Example
SP	1	2	Command	**SP**
Separator	3	1	Optional	**;**
Setpoint	4	1	1 or 2	**2**
Separator	5	1	Optional	**;**
Value	6	1–7	Including decimal point or comma, example: SP2100.5 sets setpoint 2 to 100.5	**100.5**

In total: 6–12 4–10 (without separator)

Response

Field	Byte	Char's	Description	Example
Error code	1	2	always 00	**00**

In total: 2

Notes:

- The setpoints 1 and 2 are assigned to the corresponding outputs 1 and 2.
- The output is set as long as the gross weight is smaller than the entered value. When the entered value is reached, the output is reset.
- After the setpoint has been reached and the output reset, it remains inactive until the SP command is sent again.

20.8 Read / Set Digital I/Os

GI Read Digital Inputs

The GI command reads the status of the digital inputs of the IT1 terminal.

Command

Field	Byte	Char's	Description	Example
GI	1	2	Command	**GI**
Separator	3	1	Optional	**;**
Input No.	4	2	Number of input that is to be read, 01 = input 1 (IN0) 02 = input 2 (IN1) 00 = read both inputs without input No. = both inputs	**01**
	In total:	3–5	2–4 (without separator)	

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table of error codes	**00**
Separator	3	1	*)	**;**
Status	4	1–2	1- or 2-digit ASCII string, consisting of 0 and 1 (0 = Off, 1 = On) Examples: 1 Input IN0 On, in response to command GI01 to read input E1 01 Input IN0 Off, Input IN1 On, in response to command GI00 to read both inputs	**1**
	In total:	4–5	3–4 (without separator)	

*) The separator sent with the command is returned by the weighing terminal in the response string.

Note: The digital outputs can only be used when the CPU board is fitted with a digital I/O module (PIM or SIO) or an external relay / transistor module is connected. Two inputs can be read.

OS Set Digital Outputs

The OS command sets the specified output (on). The IT1 always returns <00>.

Command

Field	Byte	Char's	Description	Example
OS	1	2	Command	**OS**
Separator	3	1	Optional	**;**
Output No.	4	2	Number of output that is to be set, 01 = Output 1 (OUT0) 02 = Output 2 (OUT1)	**01**
	In total:	5	4 (without separator)	

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table of error codes	**00**
	In total:	2		

Notes:

- The digital outputs can only be used when the CPU board is fitted with a digital I/O module (PIM or SIO) or an external relay / transistor module is connected. Two outputs can be set.
- Outputs cannot be set simultaneously.

OC Clear Outputs

The OC command resets the specified output (off). If '00' is sent, both outputs are reset. The IT1 always returns <00>.

Command

Field	Byte	Char's	Description	Example
OC	1	2	Command	**OC**
Separator	3	1	Optional	**;**
Output No.	4	2	Number of output that is to be reset, 01 = Output 1 (OUT0) 02 = Output 2 (OUT1) 00 = Both outputs (OUT0 and OUT1)	**01**
	In total:	5	4 (without separator)	

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table of error codes	**00**
	In total:	2		

Note: The digital outputs can only be used when the CPU board is fitted with a digital I/O module (PIM or SIO) or an external relay / transistor module is connected. Two outputs can be reset.

20.9 Lock Keyboard

LK Lock Keyboard

The LK command locks the complete keyboard.

Command

Field	Byte	Char's	Description	Example
LK	1	2	Command	**LK**
Separator	3	1	Optional	**;**
Keylock on/off	4	1	1 = keyboard locked 0 = keyboard unlocked	**1**
	In total:	4	3 (without separator)	

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table of error codes	**00**
	In total:	2		

Note: Depending on the setting in Service Mode, group 'Application', the keyboard can be locked by switching on a digital input with priority to the LK command.

20.10 Set Background Color

DC Set Background Color

The DC command can be used to change the background color of the complete display.

Note: The <DC> command without color specification sets the default background colors of the display.

Command

Field	Byte	Char's	Description	Example
DC	1	2	Command	**DC**
Separator	3	1	Optional	**;**
Color	4	1	0 = black 1 = red 2 = green 3 = yellow 4 = blue 5 = magenta 6 = cyan 7 = white 8 = orange none = default background color	**2**
	In total:	4	3 (without separator)	

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table of error codes	**00**
	In total:	2		

20.11 Separators

The following table shows the separators that may be used in a command string. The separator transmitted in the command is repeated in the response string returned by the weighing terminal.

Key code Hexadecimal	Key code Decimal	Character
01–1F	001–031	e.g.: STX, ETX, ACK, NAK, CR,...
21–2F	033–047	e.g.: “, #, ’, /
3B	59	Semicolon **;**
7C	124	Pipe **|**

20.12 Error Codes

Error No.	Description
00	No error
11	General scale error (e.g. no connection to load cell)
12	Scale overload (maximum weighing range exceeded)
13	Scale in motion (not settled after 6 seconds)
15	Error taring (e.g. wrong tare format) or Error zero setting (e.g. not in zero range)
20	Scale in underload
31	Transmission error (e.g. data string too long or timeout)
32	Invalid command
33	Invalid parameter
39	Keyboard cannot be unlocked (locked via digital input)

21 Data Transmission

Note: Data transmission must be enabled in Supervisor Mode 'With PC? = Y' and the interface must be correctly configured under 'Select: Application' / 'Host port: Ethernet or SIM1.'

If data transmission is enabled, a data string is sent to the host system after each completed weighing cycle. This is the case, for instance, after a completed filling cycle (operating mode *FILL*) or after confirming the result of the classification (operating mode *CHECK*).

The structure of a data string looks as follows:

999	Terminal-No, as specified in Service Mode\Service\Network
10.01.04	Date
10:24	Time
999999	With ASM installed: Ident No. of record in data archive; without ASM: Consecutive No.
10:24	Formatted time
99999,99 kg	Formatted gross weight
99999,99 kg	Formatted tare weight
99999,99 kg	Formatted net weight
999999	Piececount in operating mode *COUNT*
99999,99 kg	In operating mode *BASIC*: Last highest net weight (only if Peak-Hold function enabled)

The individual data fields are separated by semicolon.

21.1 Protocol For Data Transmission

The data transmission protocol can be specified in Service Mode\Service\Interface\Comx. If the ACK/NAK protocol is used data transmission is carried out as described below:

Terminal → PC

Control Character / Data	Comment
Start character	Can be selected or deselected in Service Mode
Data fields in ASCII-format	Data fields and their length, sequence and decimal point location depend on the configuration. The individual fields are separated from each other with a semicolon.
End character	Can be selected or deselected in Service Mode
Checksum	Can be selected or deselected in Service Mode, options: XOR, compliment of twos, no checksum

PC → terminal

Control Character / Data	Comment
ACK	Positive confirmation for correctly received data string

or

PC → terminal

Control Character / Data	Comment
NAK	Negative confirmation for not correctly received data string

The IT1 timeout delay for the reception of ACK or NAK is 6 sec. If a response cannot be received within 6 sec or if a negative response is received (NAK), the transmission of the data string is repeated up to 4 times. If after a total of 5 transmission attempts a response cannot be received or if only negative responses are received, an error message is indicated on the display of the IT1 terminal which must be acknowledged by the operator.

22 Firewall Function

Network-enabled devices may be equipped with a firewall. This allows to determine what connections may be established to the respective device (incoming traffic) and what connections the device may establish with other participants (outgoing traffic), using a set of rules to allow or prevent the access to certain network services. On the one hand, a network service whose access is blocked cannot be used anymore; on the other hand, this service causes no further risk as potential intruders have no possibility to abuse it.

The system enables network services via so-called ports with allocated addresses ranging from 1 to 65535 if the TCP/IP or UDP/IP protocols are used. The ports from 1 to 1024 are exclusively assigned to certain services with respective names (e.g. port 80 for http / unencrypted web pages); the other ports are at the developer's free disposal to build custom network services.

The SysTec weighing terminals offer some standardized network services as well as SysTec-custom services, e.g. for firmware updates or to enable the remote display for another device via network.

As of firmware V4.I4_R9000_20180605 / V4.I6_R9000_20180605, SysTec weighing terminals manufactured after June 05, 2018 are equipped with a firewall function to restrain the incoming access of the provided network services. This firewall function is optional. The weighing terminal is fully functional when the firewall is disabled. If other measures have been taken to secure the pertaining network, it is also feasible not to enable the built-in firewall.

The firewall is disabled by default to facilitate integrating the weighing terminal into the installation. It can be configured according to the local requirements in Service Mode group 'Network' using the following table (see chapter 'Network').

Please keep in mind that deactivating the required ports leads to a limited network functionality of the SysTec device and may even block its access entirely. Therefore, the firewall configuration must only be performed in a secured environment by experienced personnel and must be checked thoroughly.

Function / service	Name in 'Network\ Excepted ports'	21	22	80	123	443	502	1234	1345	1998	1999	2000	2001	2002	2003	2005	2050	2051	3000	3001	11122	30000	30001	30002	30003	30004	30005	8001
External PLC	plc						X																					
Firmware updates	firmware		X							X	X																	
FTP	ftp	X																				X	X	X	X	X	X	
IT *CONFIGURATOR*	itconfigurator		X							X	X	X				X				X								X
NTP	ntp				X																X							
PC *CHECK*	pccheck												X				X	X										X
PC *Scaletool*	pcscaletool												X						X									
PC *SCALEVIEW*	pcscaleview																			X								X
QtDisplay	qtdisplay											X	X			X												
QtMonitor	qtmonitor											X	X			X												
Remote scale	remotescale																			X								
RTC application	rtcapp							X																				
RTC *MONITOR*	rtcmonitor											X				X				X								
RTC *WIN*	rtcwin		X							X	X			X	X													X
Search terminal	scan																											X
SFTP	sftp		X																									
Web Interface	webinterface			X		X			X																			

23 Transport, Maintenance And Cleaning

23.1 Transport

Notes:

- Transport and storage of the device only in the original packing with foam cushions. The device must not be exposed to shock or vibrations.
- Transport and storage of electronic components such as boards, EPROMS, etc. must only be made in suitable anti-static ESD bags or cases.
- Storage temperature –25 to +70 °C at 95 % max. relative humidity without condensation.

23.2 Maintenance

CAUTION

This device and its associated equipment must be maintained by qualified personnel only, who are familiar with the construction and operation of all equipment in the system and the potential hazards involved. Failure to observe these precautions could result in bodily injury!

Disconnect all power to this device before servicing!

The weighing terminal is designed to require a minimum of maintenance and service, however, depending on the environmental conditions, a visual inspection at regular intervals is recommended. The frequency at which normal maintenance (cleaning and inspection) should be performed, when installed in a clean office environment, should be twice a year. However, if the unit is subject to a dusty or dirty environment, the frequency should be increased as required. At these inspections, it should be made sure that all connected cables are undamaged and that all connectors are tightly fastened.

Maintenance of scale platforms is required at regular intervals depending on use and environment. The accuracy of scales can be affected by dirt, foreign objects, etc. and appropriate maintenance is strongly recommended. Also recommended is the calibration with certified test weights at regular intervals.

A functional test can be carried out with the Service Mode program.

23.3 Cleaning

CAUTION

Disconnect all power to this device before cleaning!

W A R N I N G

Observe the safety data sheet of the respective cleaning agents! Cleaning agents and chemicals may cause irritation and/or harm to health! Wear suitable protective clothing (e.g. gloves, eye protection)!

CAUTION!

Concentrated leaches or acids, solvents, pure alcohol, chloric or saline cleaning agents must not be used.

The keyboard overlay is resistant to acetone, trichloro, alcohol, ether, nitric acid (20 %), hexane, sulphuric acid (20 %) and all-purpose cleaners.

Clean the keyboard and covers with a soft clean cloth that has been dampened with a mild window type cleaner or detergent. Do **NOT** use any type of industrial solvent or the finish of the unit may be damaged. Do not spray cleaner directly on the unit.

If cleaning agents are used that contain leach, acid or alcohol, pure water must be used to wash off any residue.

23.3.1 General Advice

Abrasive cleaners, strong detergents, scouring pads, brushes or steel wool must not be used for the cleaning of the device. Wet cleaning with a lint-free cloth or simple rinsing-off is recommended. Use of solvents and chemicals can affect the surface and make it pale. Also, attached name plates, notices or warning signs may be damaged. Please refer to the respective chapters for further details.

Clean the device at room temperature and avoid extreme conditions such as heat, direct sunlight or temperatures below freezing point. Do not use mechanical tools, e.g. rotating brushes or wipers.

Cleaning of the device should only be made with appropriate intensity to avoid unnecessary wear and tear. Aging and long-term material load caused by environmental influence and handling may have an effect on tightness and condition of the device. Therefore, it is required to inspect all components at regular intervals and replace them if necessary (e.g. brittle gaskets).

23.3.2 Cleaning With Hose Water

The housing variants desk-top/wall-mount and panel-mount meet the requirements of ingress protection following IP6x in accordance with EN 60259 (dust-tight and complete protection against access) and IPx9K in accordance with ISO 20653 (protection against high-pressure/steam-jet cleaning, in particular for road vehicles).

The max. temperature for high-pressure/steam-jet cleaning is 80 °C, the max. pressure 90 bar. The min. distance between nozzle and surface of the housing must be kept at 30 cm, and the jet must not be directed to the same spot for an extended period (>3 sec). The flow rate must not exceed 15 l/min. Before cleaning, the high-pressure/steam cleaner must be adjusted accordingly. When severe contamination is experienced, it is recommended to soak and/or pretreat the affected spots. Inappropriate handling of the cleaning equipment can damage the device!

Direct water jet cleaning of cable glands with or without introduced cables should be made with caution since gaskets and cable jackets could be affected. Avoid direct impact of jet cleaning on gaskets!

23.3.3 Use Of Detergents

Cleaning with special cleaning agents or chemicals is possible, however, it is recommended to use mild commercially available detergents and not aggressive cleaners. Make sure that name plates, signs and safety notices are not damaged. Most detergents can be used for short-term application and can only cause damage if the unit is subjected to them over a longer period of time. The unit should be rinsed off immediately after cleaning with pure water. In case of uncertainty about the proper choice of the detergent, it can be tested on a small area.

Recommended detergents are listed below:

Soap solution, mild household type cleaner, window cleaner, diluted ethanol (5 %).

For stubborn dirt, other detergents may be used depending on the material composition.

The device consists of several components with different resistance against detergents and chemicals which must be chosen depending on the material they are to be applied to. The following materials are used in the design of the device:

- Housing: Stainless steel (V2A / 1.4301 / AISI 304)
- Keyboard overlay: Autotex F200
- Display pane: PMMA (polymethyl methacrylate)
- Cable glands: Nickel-plated brass, sealing clamp for cable NBR
- Gasket of lid: EPDM (desk-top/wall-mount version), CR (panel-mount version)

23.4 Disposal (Duty of information, duty of notification ElektroG3)

23.4.1 Symbol of Crossed-Out Wheeled Bin

The symbol of the crossed-out wheeled bin on the product, packaging and / or accompanying documentation means that the disposal of electrical and electronic equipment as domestic waste is prohibited. The improper disposal of end-of-life equipment and batteries can harm the human health and the environment due to possible pollutants contained. The take back ensures correct disposal and contributes to environmental protection.

23.4.2 Batteries / Accumulators

Remove the battery and dispose of it separately. This device contains the following battery: 3 V lithium battery of type Varta CR2032.

23.4.3 Data Protection

If personal data is stored on the device to be disposed of, you as the end user are responsible for deleting this data before returning the device.

23.4.4 End-of-Life Electronic Equipment

The devices of SysTec Systemtechnik und Industrieautomation GmbH are professional electric devices, so-called Business to Business devices (B2B). We take back and dispose of end-of-life electronic equipment according to § 19 of the ElektroG (German Electrical Equipment Act).

Please contact us at the following e-mail address prior to shipping end-of-life electronic equipment: repair@systecnet.com

You can then ship the end-of-life equipment to the following address:

SysTec Systemtechnik und Industrieautomation GmbH
Reparatur- und Altgeräte-Annahmestelle
Ludwig-Erhard-Straße 6
D-50129 Bergheim-Glessen
Germany

23.5 Notice And Information Obligation In Accordance With §18 Battery Act

In the context of the sale of batteries or rechargeable batteries, or devices that are operated with batteries or rechargeable batteries, we are obliged as a dealer under the German Battery Act (BattG) to provide information about the relevant regulations and obligations.

23.5.1 Return Of Used Batteries

Used batteries can be returned by sending a pre-announcement to rma@systecnet.com prior to sending them by mail to our collection point:

SysTec Systemtechnik und Industrieautomation GmbH
Reparatur- und Altgeräte-Annahmestelle
Ludwig-Erhard-Straße 6
50129 Bergheim-Glessen

Old batteries can contain pollutants which, if not properly stored or disposed of, can damage the environment or your health. As an end-user, you are obliged by law to return used batteries and rechargeable batteries. Disposal with normal household waste is prohibited and violates the Battery Act.

Returning batteries is free of charge. You are also welcome to return batteries/rechargeable batteries purchased from us free of charge after use. Please ensure that your return shipment of used batteries/rechargeable batteries has sufficient postage.

23.5.2 Symbols

The symbol of a crossed-out wheeled bin on batteries and rechargeable batteries indicates that they must not be disposed of with household waste at the end of their service life, but must be disposed of separately from household waste.

When the batteries or rechargeable batteries contain pollutants such as mercury (Hg), cadmium (Cd) or lead (Pb), the relevant chemical symbol can be found below the symbol of the crossed-out wheeled bin.

23.5.3 Waste Prevention

Batteries contain valuable raw materials such as iron, zinc, manganese or nickel, and are recycled. Avoid the generation of used battery waste, use rechargeable batteries and accumulators. Used batteries and accumulators contained in electronic devices must be disposed of separately. Prior to disposal, it should be checked whether the battery can be recycled, e.g. through reconditioning.

Batteries can contain hazardous chemical materials that are harmful to the environment and health. Special caution should be exercised when using lithium-containing batteries, as these can easily ignite and can cause fires if handled incorrectly.

The separate collection and recycling of used batteries and accumulators is intended to prevent negative effects on the environment and human health and to recover important valuable raw materials.

Further information on the Battery Act is provided by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (www.bmu.de).

23.6 Replacing The Battery

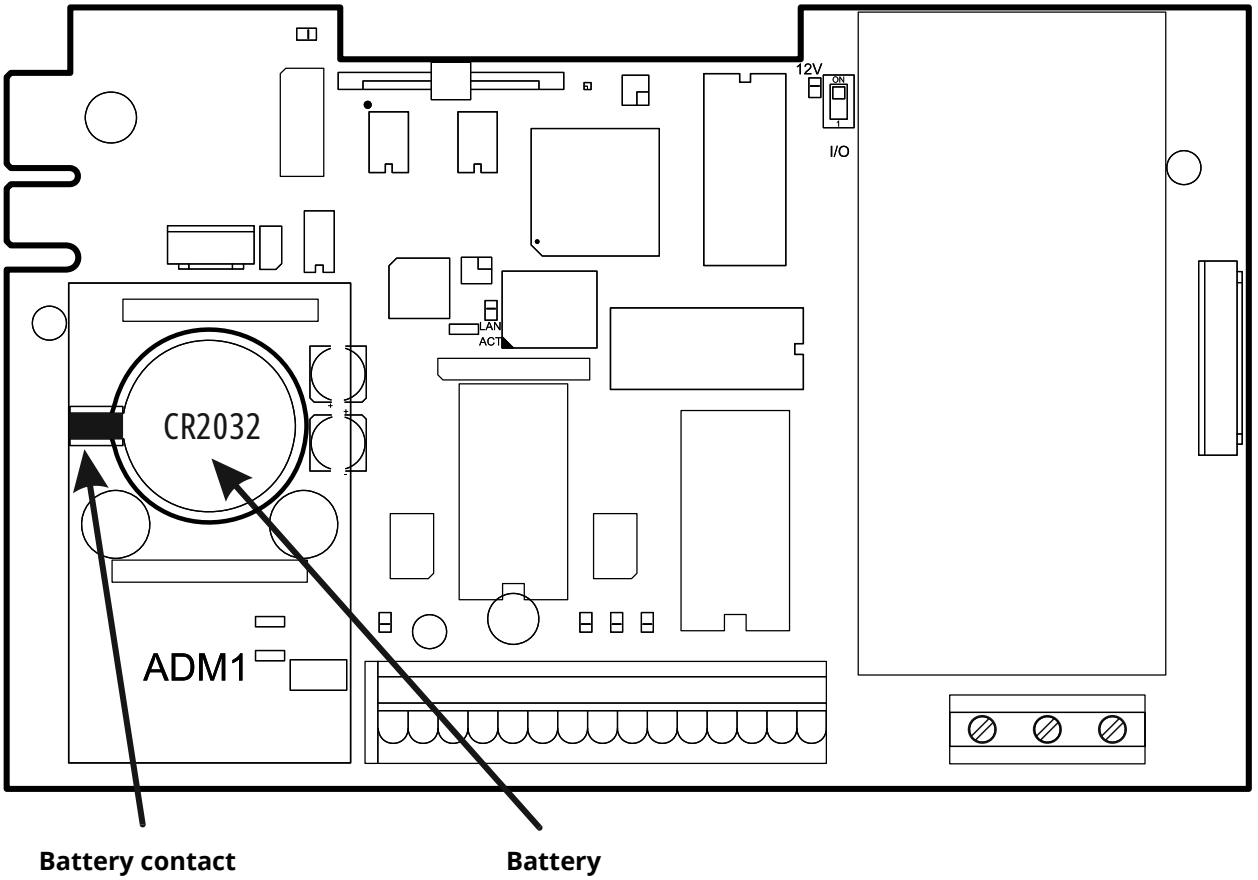
W A R N I N G
Disconnect all power to the device and/or unplug line cord prior to opening the housing! Failure to observe this precaution could result in bodily injury!

CAUTION
For the storage of data the device contains a lithium battery. Risk of explosion if battery is replaced improperly! Replace only with battery of the same type or with compatible type recommended by manufacturer. Disposal of used batteries only as indicated by manufacturer.

CAUTION
In order to prevent data loss, the new battery must be inserted within 30 seconds after removing the old battery!

CAUTION
Only touch battery with suitable gloves to avoid contamination of contact surface.

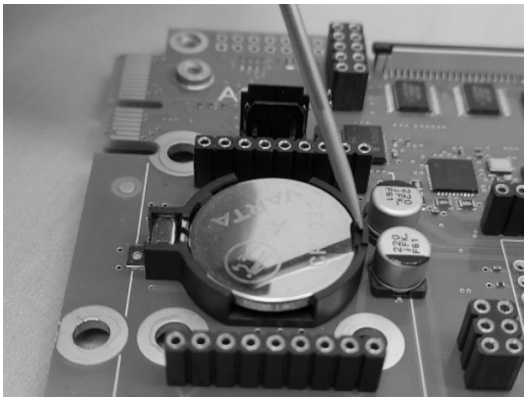
The lithium battery for the backup of RAM and real-time clock has a lifetime of 5–10 years under normal operation. It is recommended that the battery be replaced every 3 years by a trained service technician.



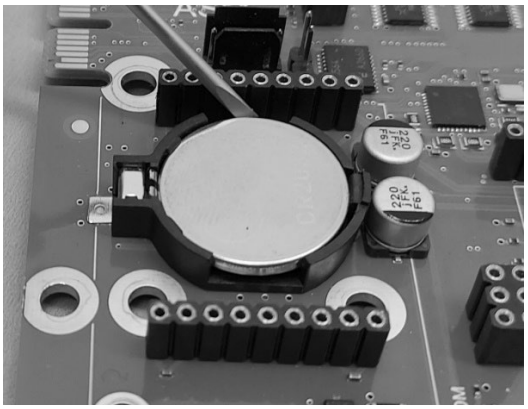
23.6.1 Removing The Battery

> **CAUTION**
> **In order to prevent data loss, the new battery must be inserted within 30 seconds after removing the old battery!**

- Disconnect all power to the device and unplug the line cord.
- Open the housing and remove the ADM module from the mainboard.
- Use a small screwdriver to carefully push the retaining lug slightly to the side so that the battery comes loose.

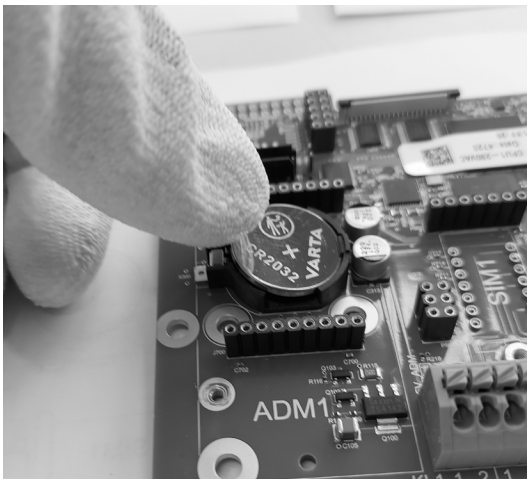


- Carefully lever the battery out of the holder from the side.
  Note: Make sure not to damage the battery contact.
- Carefully remove the old battery from its holder and insert a new one within 30 seconds.



23.6.2 Inserting The Battery

- Ensure that the label on the battery (CR2032) is facing upwards.
- Wearing gloves, insert the new battery at the retaining lug on the opposite side of the battery contact first.
- Then press down the battery until it clicks into place.



- Close and screw down the housing and switch on the mains voltage. The display of the weighing terminal shows a power-up message, indicating that the device is operational again.

When disposing of used batteries, please refer to the chapters 'Disposal' and 'Notice And Information Obligation In Accordance With §18 Battery Act'.

24 Trouble Shooting

CAUTION
This device does not contain any customer serviceable parts!

Only permit qualified personnel to service this device. Exercise care when making checks, tests, and adjustments!

If any problem arises that has not been explained above, please follow this check list:

- Power supply on and line cord undamaged (visual inspection)?
- All cables connecting to scales and peripheral devices undamaged (visual inspection)?
- Connectors fitted correctly and tightly secured at peripheral devices (visual inspection)?

If operational difficulties are encountered that cannot be rectified by means of this manual, obtain as much information as possible regarding the particular trouble, as this may eliminate a lengthy, detailed checkout procedure.
If possible, try first to determine the conditions under which the problem occurs. Try to find out whether the appearance of the difficulties can be reproduced under the same conditions.

For the systematic analysis of an unknown problem, the information as listed below is required:

- Serial No. of the unit and its peripheral components
- Program version as displayed on power-up
- Exact wording of any error message displayed
- Type and model of peripheral devices related to the problem (e.g. scale, printer, etc.)

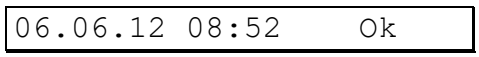
To obtain professional assistance contact your service station stating the information listed above.

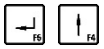
CAUTION
It is suggested that assistance from trained service personnel be requested in the event a problem should arise that is beyond the scope of this instruction manual.

24.1 Error Log Of Scale

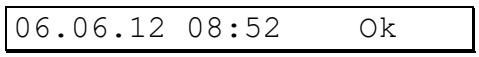
Log 

View error log of scale.



OK Return 

Select



Quit 

Return to **'Calibrate Scale 1'**

Date, time and error code of event are shown.

Code	Event
Ok	OK, previous error no longer active
Over	Scale overloaded
Under	Scale in underload
Range	ADM out of range
Miss.	ADM not installed
Incl.	Error incline sensor
PUOvr	Powerup out of range
PUUdr	Powerup motion
Invalid	Not calibrated
IOErr	I/O error to ADM
Not I	Scale driver not installed
NotOk	Not OK (general error)
E32	Other error message 32
66	Service Mode active

24.2 Error Messages

If an error occurs during calibration or normal operation, error messages are displayed as follows:

Error Message	Possible Cause	Corrective Measure
Calibration Locked	• Jumper for protection of calibration parameters in position 'protected'	• Set calibration jumper to calibration position
Error Calibr. Jumper	• Parameters cannot be saved, jumper in wrong position	• Set jumper to correct position, repeat calibration
ADM not installed	• No ADM installed	• Check ADM
Not Available	• No scale selected	• Check parameters in Service Mode
ADM defect	• No data received from ADM • Short circuit in load cell cable	• Replace ADM • Check cabling
Invalid Setupdata	• Calibration data incompatible to selected scale driver • ADM defective	• Check scale configuration • Repeat calibration • Replace ADM
Resolution Error	• Internal resolution too small, must be at least tenfold the displayed resolution	• Select bigger increment size • Use load cell with lower capacity
Out Of Range	ADM overrange: • Wiring error load cell • Load cell defective • Scale heavily overloaded	 • Check wiring • Check load cell • Unload scale

Error Message	Possible Cause	Corrective Measure
Overload	• Scale in overload	• Unload scale
--------	• Setting to zero or taring impossible because of scale in motion	• Settle scale
	• CPU does not receive data from weighing interface	• Check internal and external wiring and cabling
U n d e r l o a d	• Gross weight smaller than −20 d (below zero)	• Load scale • Set parameter 'Underload 20d' to N= disabled
Powerup Out of Range	• Error power-up zero. This message appears on power-up if the weight on the scale exceeds the power-up zero range (+2 %, +10 %) or is below the power-up zero range (−2 %, −10 %) as set in the calibration.	• Unload scale or apply dead load
Powerup Motion	• This message appears on power-up if the device cannot detect a settled weight within the specified power-up zero range (±2 %, ±10 %).	• Settle scale

The following error messages can appear on the auxiliary display:

Error Message	Possible Cause	Corrective Measure
Scale error	• General scale error (see error message on weight display)	• See error message on weight display
Error Transmission	• Host switched off or off-line	• Switch on host and start communication program
	• Data cable not connected or damaged	• Check cable and connectors
		• If problem cannot be rectified, disable data transmission in Supervisor Mode
Error Taring	• Gross weight below zero	• Load scale
	• Terminal cannot detect a settled weight within 6 seconds	• Settle scale
Printer error	• Printer switched off or off-line	• Switch on printer
	• Data cable not connected or damaged	• Check cable and connectors
		• If problem cannot be rectified, disable printer in Supervisor Mode
Scale in Motion	• Capturing weight: Terminal cannot detect a settled weight within 6 seconds	• Settle scale
Gross under zero	• Capturing weight: Gross weight below zero	• Load scale
Out of Zero Range	• Setting to zero: Terminal cannot detect a settled weight within 6 seconds	• Load or unload scale

After switching the terminal on:

Error Message	Possible Cause	Corrective Measure
Error real time clock **Check battery and date/time** **Press ENTER to continue**	• Date/time invalid: the lithium battery could not constantly supply the real-time clock when the device was in de-energized state.	• Check and – if necessary – replace lithium battery • Check and clean contacts of the battery holder • Check and set date and time
Error battery-backed RAM **RAM not detected ...** **Press ENTER to continue**	• The battery-backed memory cannot be recognized.	• Install current firmware • Replace CPU
Error battery-backed RAM **Check lithium battery** **Press ENTER to continue**	• Loss of data in battery-backed RAM: the memory could not be permanently supplied with power from the lithium battery when switched off	• Check lithium battery, replace if required • Check contacts of battery holder, clean if required

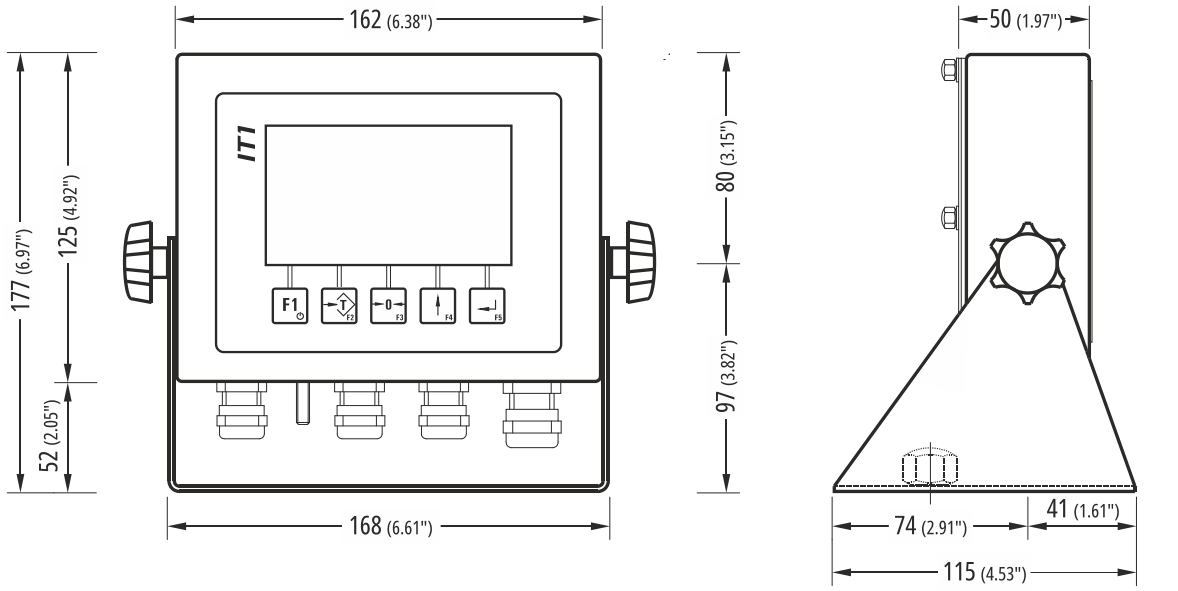
25 Technical Data

Housing	Stainless steel wall/desk-top housing, protected to IP65 / IP69K, weight approx. 1.5 kg
	Panel-mount stainless steel housing, fascia plate protected to IP65, weight approx. 1.5 kg
Temperature Range	Storage: –25 °C to +70 °C at 95 % relative humidity max. without condensation Operation: –10 °C to +40 °C at 95 % relative humidity max. without condensation
Height Above Mean Sea Level	< 5,000 m AMSL
Power Supply AC Version	Supply Voltage: 110 V (–15 %) – 240 V (+10 %) Rated Frequency: 50–60 Hz Current Consumption: 0.25–0.1 A
Power Supply DC Version	Supply Voltage: 12 V (–15 %) – 24 V (+25 %) Current Consumption: 1100–350 mA
Electrical Safety	Separation between primary and secondary circuits SELV, in accordance with EN 62368
Display	Active color TFT, 10.9 cm (4.3")
Keyboard	Membrane keyboard with tactile feedback, 5 keys incl. scale keys and function keys, softkeys
Processor	32-bit ARM processor, 266 MHz, Linux operating system
Scale Interface Module	ADM to connect to analog load cells in 4- or 6-wire mode, resolution up to 10,000 increments W&M approved, up to 800 updates/sec, load cell impedance 43–3300 Ω, DWB to connect to digital load cells with RS485 interface, DWB-Keli for the connection of digital load cells of Keli Sensing Technology and the series ZSF-D and ZSW-D, IDN to connect to Mettler-Toledo force transducers with IDNet interface.
Battery	Battery CR2032 As backup for power-fail-safe date / time function, lifetime in normal operation approx. 10 years, approx. 5 years when unit is permanently switched off.

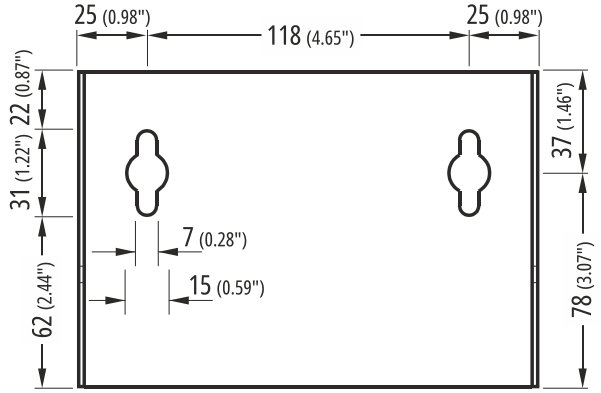
Options:

Serial Interface Modules, 1 x SIM	SIM-RS232, SIM-RS485-4-wire, SIM-RS485-OPTO, SIM-20mA (only passive / passive), baud rate 300–19200 baud
Digital I/O Modules, 1 x PIM	2 opto-isolated digital inputs (12–24 V DC / 7 mA) 2 opto-isolated digital outputs (12–24 V DC / 100 mA)
Digital I/O Modules, 1 x PIM500	2 opto-isolated digital inputs (12–24 V DC / 7 mA) 2 opto-isolated digital outputs (12–24 V DC / 500 mA)
Digital I/O Modules, 1 x SIO	1 opto-isolated digital input (12–24 V DC / 7 mA) 2 opto-isolated digital outputs (12–24 V DC / 100 mA)
Analog Output Module, 1 x DAU15	1 analog output related to gross or net weight, 0–20 mA, 4–20 mA, 0–10 V, 2–10 V selectable
Ethernet Module 1 x SIM-NET	1 connection to 10/100 MBit Ethernet networks
USB Module 1 x SIM-USB	1 connection to USB devices (current drain up to 500 mA)
Memory Module 1 x ASM	1 memory module for W&M approved weight storage (data archive), capacity sufficient for 1,000,000 records

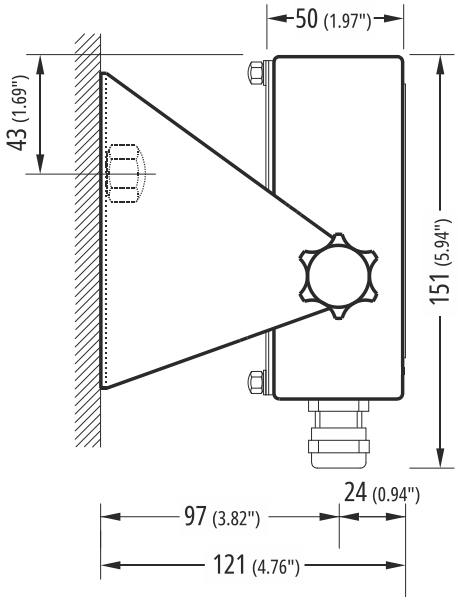
26 Dimensions



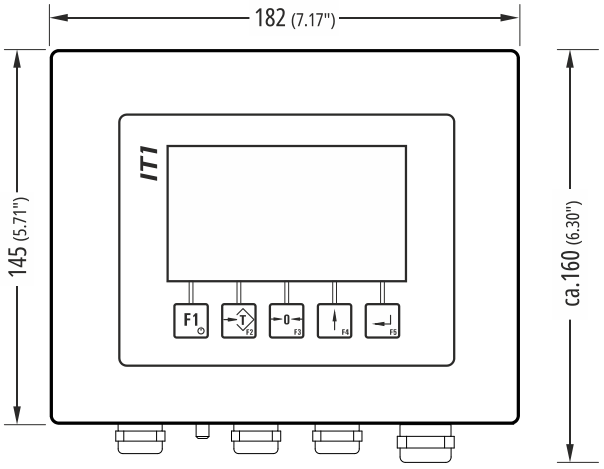
Fixing holes



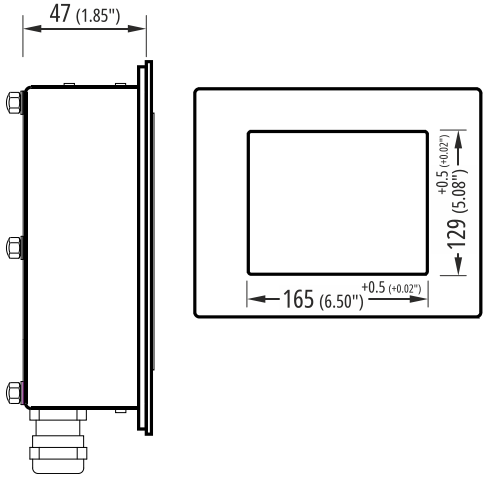
Wall-mount installation



Panel-mount installation



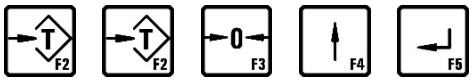
Cutout in panel



27 Service Password

The service password is required to access the Service Mode.

The password is:



If you want to prevent unauthorized access to the Service Mode, remove this page from the manual and keep it in a safe place.

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