



HEIDENHAIN



Product Overview

Touch Probes

The New Generation

September 2013

Touch probes from HEIDENHAIN

—The new generation

HEIDENHAIN has been developing touch probes for workpiece and tool measurement on machine tools for over 25 years now, and has set the standard several times with the following features:

- The wear-free optical sensor
- The first transmitter/receiver unit capable of being fully integrated in the spindle housing
- The integrated cleaning blower for cleaning the measuring point
- The first battery-free touch probe without cable connection

Along with the technical advantages, HEIDENHAIN and its subsidiaries also offer reliable service in over 50 countries: Regardless of the country in which the machine with the touch probe finally lands, HEIDENHAIN supports you on site.

Of course the new generation of touch probes from HEIDENHAIN is based on experiences with the current touch probes. Numerous improvements make working with the touch probes easier and more reliable, so that their use by the operator becomes more efficient.

Compact design

The particularly compact design makes it possible to use the touch probes even where installation space is limited. The smaller contours of the TS permit much freedom when tilting into position.

Optimum structure

The fastening element, sensor and probe contact are in a straight line. No adjustment is necessary. Simply mount and calibrate the touch probe, and off you go.

Reliable measurement results

Clean measuring points are a prerequisite for high process reliability. That is why all TS workpiece touch probes from HEIDENHAIN have blower jets for cleaning the workpiece, either with coolant or compressed air.

Wear-free optical sensor

The optical sensor is free of wear, and so provides the specified probing reproducibility even after a large number of probing processes (5 million switching cycles during type testing). This means that touch probes from HEIDENHAIN are excellently suited for grinding machines. The optical sensor features an optimized lens system and an integrated preamplifier for stable output signals.

Conventional batteries

Energy is supplied by 1/2 AA size conventional batteries (e.g. lithium or alkaline) or rechargeable batteries. The batteries can be exchanged in a user-friendly manner, without any tools.

Electrically compatible

The **TS 260** and **TT 160** touch probes have both an HTL switching output and a floating trigger signal. Direct connection, without an interface or amplifier, to Fanuc controls is therefore possible, even to the "high speed skip" input.



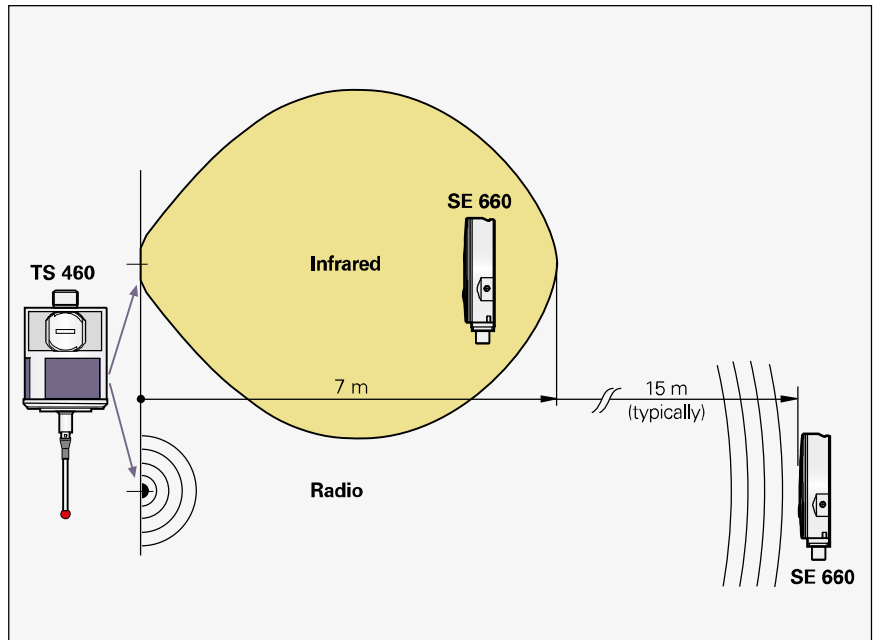
— Innovative technology

Hybrid technology: Signal transmission via radio and infrared signals

The dual signal transmission combines the advantages of radio waves (high range and large amounts of data) with infrared signals (highest accuracy and fast signal transmission). This way, one version of a touch probe can be operated on different types of machines (milling machines, lathes, grinding machines) and any machine sizes (from small and enclosed to large and open). Difficult applications, such as plunging into a cylinder, are also not a problem.

Radio transmission operates at 2.4 GHz and has 16 channels. The range is usually 15 m, but in practice much larger ranges are possible under ideal circumstances. Each touch probe is uniquely addressed.

Infrared transmission has a range of 7 m. The 5 MHz carrier frequency method used provides very high noise immunity and extremely short transmission times. This permits exact measurement results, regardless of the probing velocity.



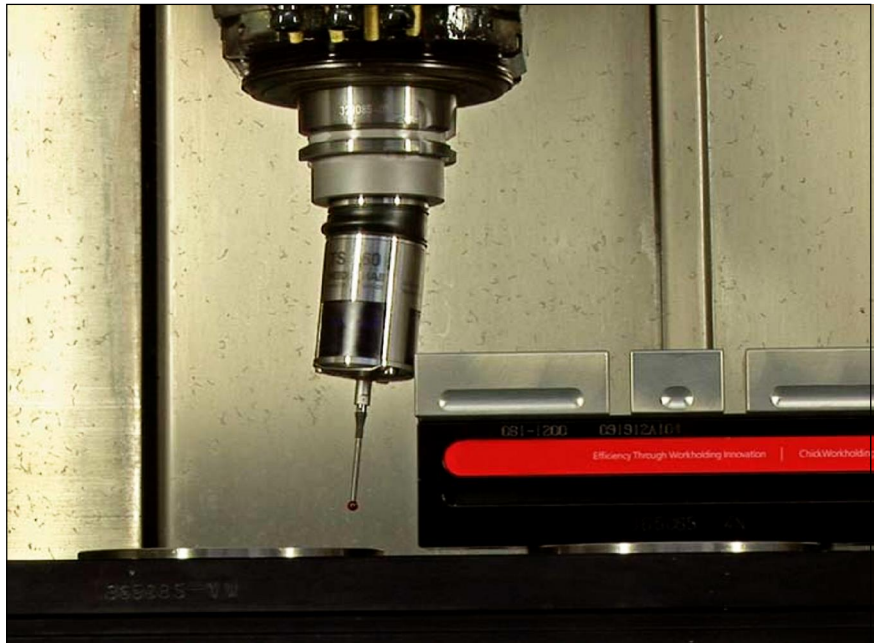
Hybrid technology: Simultaneous signal transmission via radio waves and infrared signals

No matter whether you work with radio or infrared transmission, you need only **one SE 660 transmitter-receiver unit**. During installation you define once whether the trigger signal is to be received via radio or infrared transmission. The SE 660 has bar displays to assist you in finding an available frequency channel.

Collision protection and thermal decoupling (option)

A mechanical adapter between the touch probe and taper shank serves as collision protection. In the event of a light collision of the touch probe housing against a fixture or workpiece, the touch probe can absorb the shock. At the same time, an integrated switch deactivates the ready signal and the control stops the machine. This collision protection is therefore only effective when the touch probe is active. The undamaged touch probe is recalibrated (via the control's calibration cycle) and you can continue working.

Furthermore, the anti-collision buffer serves for thermal decoupling. This protects the touch probe from being heated by the spindle.

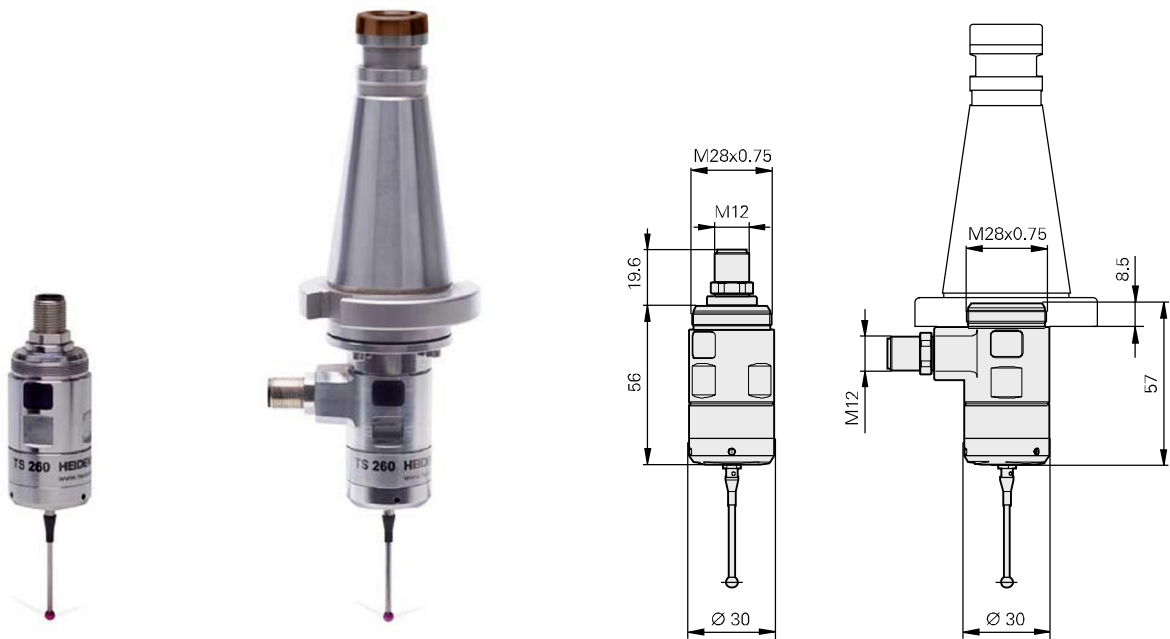


Workpiece touch probes

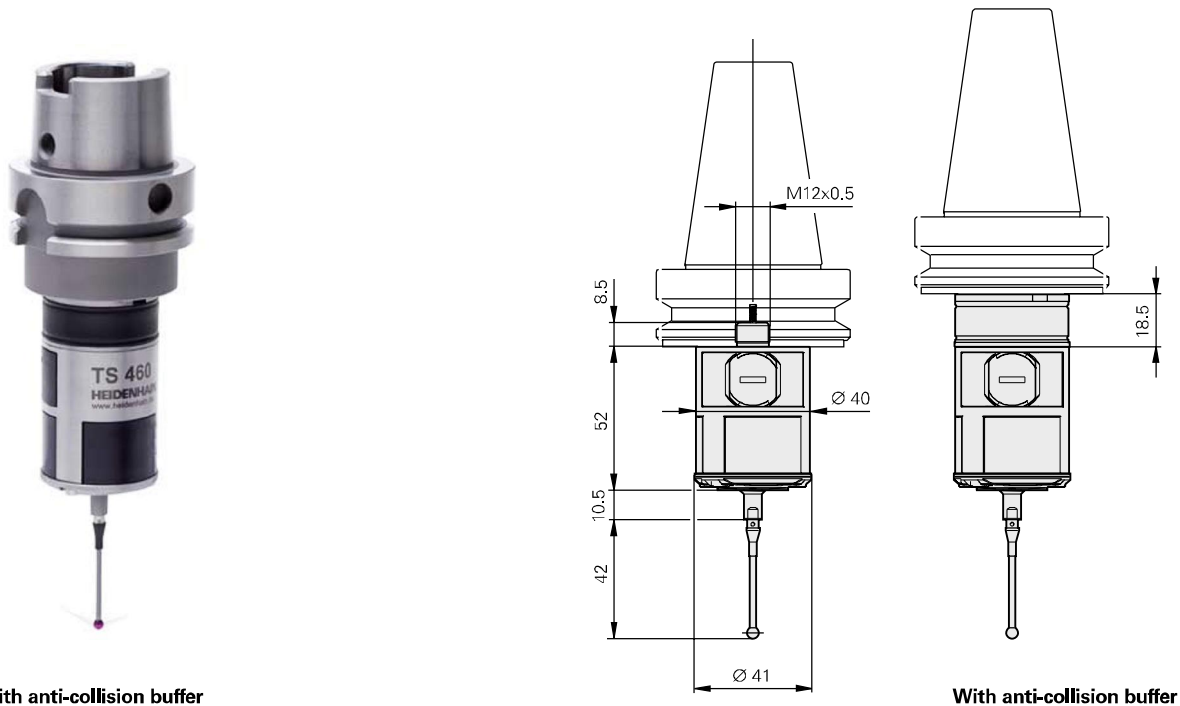
TS 260

TS 460

TS 260



TS 460



Workpiece touch probe	TS 260	TS 460
Probe accuracy	$\leq \pm 5 \mu\text{m}$ when using a standard T404 stylus	
Probe repeatability Repeated probing from one direction	$2\sigma \leq 1 \mu\text{m}$ at a probing velocity of 1 m/min <i>Typical values:</i> $2\sigma \leq 1 \mu\text{m}$ at a probing velocity of 3 m/min $2\sigma \leq 4 \mu\text{m}$ at a probing velocity of 5 m/min	
Deflection of probe contact	$\leq 5 \text{ mm}$ in all directions (with stylus length $L = 40 \text{ mm}$)	
Deflection force	<i>Axial:</i> approx. 8 N <i>Radial:</i> approx. 1 N	
Probe velocity	$\leq 5 \text{ m/min}$	
Collision protection*	–	Optional
Protection EN 60529	IP 67	
Operating temperature	10 °C to 40 °C	
Storage temperature	–20 °C to 70 °C	
Weight (approx.)	0.15 kg (without taper shank)	0.2 kg (without taper shank)
Fastening*	<ul style="list-style-type: none"> • With taper shank¹⁾ (only with radial flange socket) • By M28 x 0.75 external thread • By coupling joint with M22 x 1 external thread 	<ul style="list-style-type: none"> • With taper shank¹⁾ • By M12 x 0.5 external thread
Electrical connection*	M12 flange socket, 8-pin; axial or radial	–
Cable length	$\leq 25 \text{ m}$	–
Power supply	15 V to 30 V DC / $\leq 100 \text{ mA}$ (with no load)	2 batteries (rechargeable or non-rechargeable), size $\frac{1}{2}$ AA or LR2; each 1 V to 4 V
Operating time	–	Continuous duty: typ. 400 h ²⁾ with lithium batteries
Output signals	<ul style="list-style-type: none"> • Trigger signals S and \bar{S} (square-wave signal and its inverted signal) • Floating trigger output 	–
HTL signal levels	$U_H \geq 20 \text{ V}$ at $-I_H \leq 20 \text{ mA}$ $U_L \leq 2.8 \text{ V}$ at $I_L \leq 20 \text{ mA}$ at 24 V DC rated voltage	–
Signal transmission	Cable	Radio or infrared transmission (selectable) with 360° range to SE
Transmitter/receiver unit*	–	<ul style="list-style-type: none"> • SE 660 for radio and infrared transmission • SE 642 for infrared transmission • SE 640 for infrared transmission • SE 540 for infrared transmission; for integration in the spindle head
TS switch-on/off	–	Radio or infrared signal (selectable) from SE

* Please select when ordering

¹⁾ See *Touch Probes* catalog for selection

²⁾ Reduced operating time if there is much surrounding radio traffic, or short but frequent probing intervals

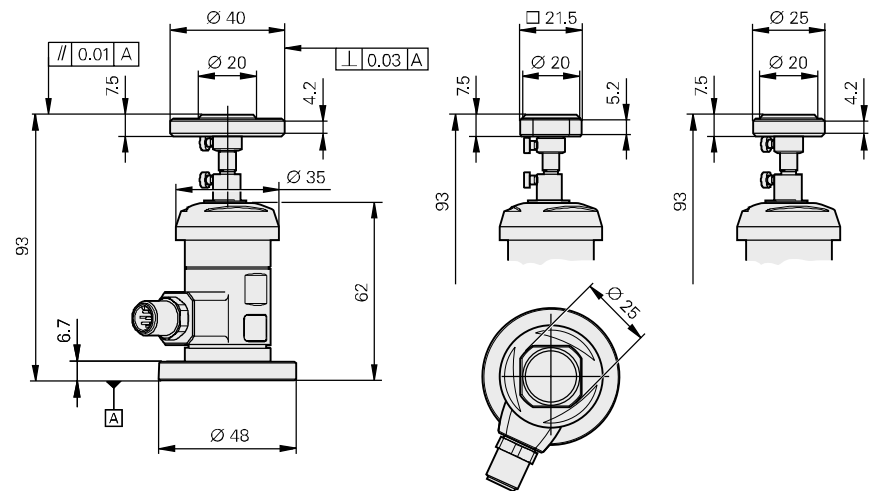
³⁾ Common SE for TS 460 and TT 460

Tool touch probes

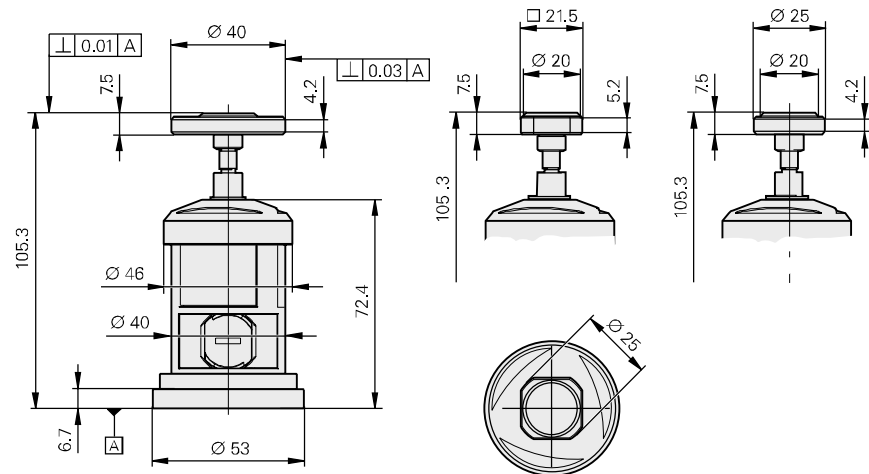
TT 160

TT 460

TT 160



TT 460



Tool touch probe	TT 160	TT 460
Probe accuracy	$\leq \pm 15 \mu\text{m}$	
Probe repeatability Repeated probing from one direction	$2\sigma \leq 1 \mu\text{m}$ at a probing velocity of 1 m/min <i>Typical values:</i> $2\sigma \leq 1 \mu\text{m}$ at a probing velocity of 3 m/min $2\sigma \leq 4 \mu\text{m}$ at a probing velocity of 5 m/min	
Deflection of probe contact	$\leq 5 \text{ mm}$ in all directions	
Deflection force	<i>Axial:</i> approx. 8 N <i>Radial:</i> approx. 1 N	
Probe velocity	$\leq 5 \text{ m/min}$	
Protection EN 60529	IP 67	
Operating temperature	10 °C to 40 °C	
Storage temperature	-20 °C to 70 °C	
Weight (approx.)	0.3 kg	0.4 kg
Mounting on the machine table	<ul style="list-style-type: none"> Fastening by fixing clamps (included in delivery) Fastening with mounting base (accessory) 	
Electrical connection	M12 flange socket, 8-pin	–
Cable length	$\leq 25 \text{ m}$	–
Power supply	10 V to 30 V DC / $\leq 100 \text{ mA}$ (with no load)	2 batteries (rechargeable or non-rechargeable), size $1\frac{1}{2}$ AA or LR2; each 1 V to 4 V
Operating time	–	Continuous duty: typ. 400 h ¹⁾ with lithium batteries
Output signals	<ul style="list-style-type: none"> Trigger signals S and \bar{S} (square-wave signal and its inverted signal) Floating trigger output 	–
HTL signal levels	$U_H \geq 20 \text{ V}$ at $-I_H \leq 20 \text{ mA}$ $U_L \leq 2.8 \text{ V}$ at $I_L \leq 20 \text{ mA}$ at 24 V DC rated voltage	–
Signal transmission	Cable	Radio or infrared transmission (selectable) with 360° range to SE
Transmitter/receiver unit	–	<ul style="list-style-type: none"> SE 660²⁾ for radio and infrared transmission SE 642²⁾ for infrared transmission
TT switch-on/off	–	Radio or infrared signal (selectable) from SE

¹⁾ Reduced operating time if there is much surrounding radio traffic, or short but frequent probing intervals

²⁾ Common SE for TS 460 and TT 460

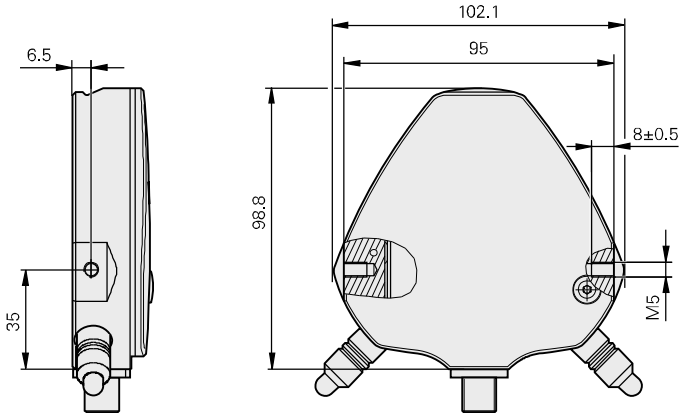
Transmitter/receiver unit

SE 660

Transmitter/receiver unit	SE 660
Area of application	In the machine's working space; for common communication with TS 460 and TT 460 using radio or infrared transmission
Input/output signals	Square-wave signals at HTL level <ul style="list-style-type: none"> Start signals R(-TS) and R(-TT) Ready signals B(-TS) and B(-TT) Trigger signals S and \overline{S} Battery warning W
Optical status indicator	For infrared transmission, radio transmission, radio channel quality, channel, operating mode and whether workpiece or tool touch probe
Protection EN 60529	IP 67
Operating temperature	10 °C to 40 °C
Storage temperature	−20 °C to 70 °C
Weight without cable	Approx. 0.3 kg
Electrical connection	M12 flange socket, 12-pin
Cable length	≤ 50 m ≤ 20 m with iTNC 530
Power supply	15 V to 30 V DC
Power consumption Without load	Normal operation: 5.1 W _{eff} (≤ 250 mA _{eff} ¹⁾ Transmission (max. 3.5 s): 8.3 W (≤ 550 mA ¹⁾)

¹⁾ At minimum supply voltage

SE 660

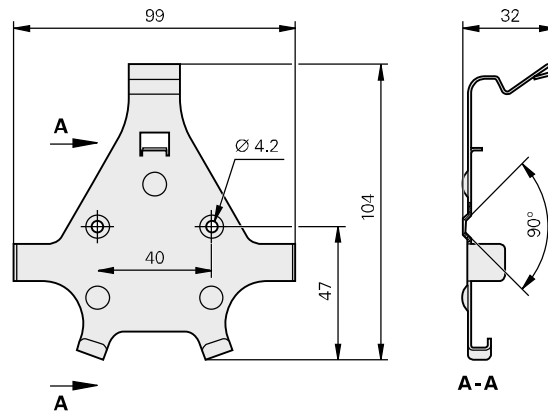


Accessories

Holder for SE 660

ID 744677-01

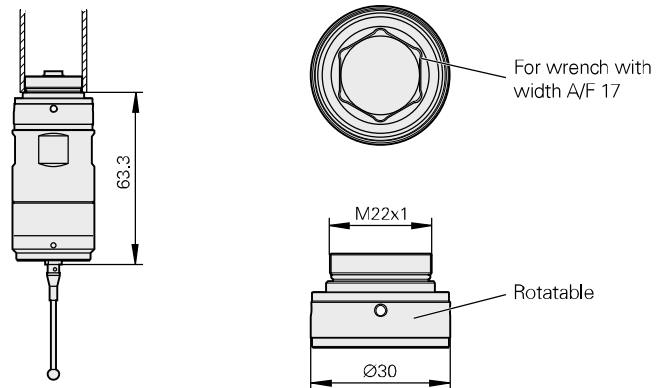
The SE 660 is easily, quickly and reliably held in place by the holder, which is available as an accessory. The holder itself is secured to a machine element via two screws, and the SE is simply clipped in.



Coupling joint for TS 260

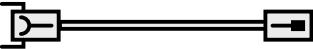



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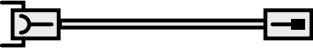

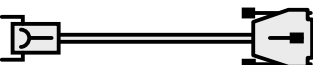
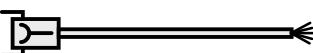
The coupling joint (M22 x 1 external thread) is used for simple attachment of the TS 260 to a machine element, mounting base or a tilting device. It also permits exact alignment parallel to the machine axes when using an asymmetrical or cuboid probe contact.








Electrical connection

TS 260, TT 160

Connecting cable for TS 260 PUR [(4 × 0.14 mm ²) + (4 × 0.34 mm ²)]		Cable Ø	
Complete with M12 connector (female, 8-pin) and M12 coupling (male, 8-pin)		6 mm	ID 368330-xx
Complete with M12 connector (female, 8-pin) and D-sub connector (male, 15-pin, double-row) to X12 on the TNC		6 mm	ID 745454-xx
Complete with M12 connector (female, 8-pin) and D-sub connector (male, 15-pin, triple-row) to X112 on the TNC		6 mm	ID 1070795-xx
With one connector M12 (female, 8-pin)		6 mm	ID 634265-xx

Connecting cable for TT 160 PUR [(4 × 0.14 mm ²) + (4 × 0.34 mm ²)]		Cable Ø	
Complete with M12 connector (female, 8-pin) and M12 coupling (male, 8-pin)		6 mm	ID 368330-xx
Complete with M12 connector (female, 8-pin) and D-sub connector (male, 9-pin, double-row) to X13 on the TNC		6 mm	ID 1070793-xx
Complete with M12 connector (female, 8-pin) and D-sub connector (male, 15-pin, triple-row) to X113 on the TNC		6 mm	ID 1070794-xx
With one connector M12 (female, 8-pin)		6 mm	ID 634265-xx



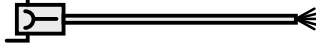
Pin layout for TS 260 and TT 160

8-pin flange socket, M12								
  								
	Power supply		Signals					
	2	7	3	4	1	5	6	8
	U _P 15 V to 30 V	U _N 0 V	S	S	B	Trigger NO	Trigger NC	Trigger 0 V
	Blue	Violet	Gray	Pink	White	White/Green	Yellow	Brown/Green



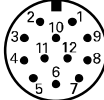


External shield is on housing. Unused pins or wires must not be engaged.

U_P = power supply; B = ready signal; S, S = trigger signal;
Trigger = Floating switching outputs (NC = normally closed, NO = normally open)

SE 660, SE 642

Connecting cable for SE 660 and SE 642 PUR [6(2 × 0.19 mm ²)]		Cable Ø	
Complete with M12 connector (female, 12-pin) and D-sub connector (male, 15-pin, triple-row) for the TNC		6 mm	ID 663631-xx
Complete with two D-sub connectors (female & male, 15-pin, triple-row)		mm	ID 1073372-xx
With one connector M12 (female, 12-pin)		6 mm	ID 801285-xx

Pin layout for SE 660 and SE 642

12-pin flange socket, M12												
												
	Power supply		Signals									
	1	12	11	5	2	10	3	4	6	9	7	8
	U _P	0V	R(TS)	R(TT)	B(TS)	B(TT)	S	\overline{S}	\overline{W}	/	/	/
	Brown/ Green	White/ Green	Blue	White	Green	Brown	Gray	Pink	Violet	Yellow	Red	Black

External shield is on housing. Unused pins or wires must not be engaged.

U_P = power supply; **R** = start signal; **B** = ready signal; **S**, **\bar{S}** = trigger signal; **\bar{W}** = battery warning

HEIDENHAIN

DR. JOHANNES HEIDENHAIN GmbH

Dr.-Johannes-Heidenhain-Straße 5

83301 Traunreut, Germany

☎ +49 8669 31-0

☎ +49 8669 5061

E-mail: info@heidenhain.de

www.heidenhain.de

This Product Overview supersedes all previous editions, which thereby become invalid. The basis for ordering from HEIDENHAIN is always the Product Overview valid when the contract is made.

For more information

- Catalog: *Touch Probes*

