

Hydraulic pilot control units for armrest installation

RE 64 555/04.06 1/12

Replaces: 05.05

Type 4TH5, 4TH6, 4TH6N

Series 1X



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Special features

- Progressive, sensitive operation.
- Low actuation forces.
- Low force deviations when lever is actuated (4TH5, 4TH6N).
- Several ergonomic grips with various E contacts.
- All connections point downwards.

Functional description, section, symbol

Design

The 4TH6, 4TH6N and 4TH5 pilot control units basically comprise of a control lever (5), four pressure adjustment valves and a housing (10).

Each pressure adjustment valve comprises of a control spool (6), a control spring (7), a return spring (8) and a plunger (9).

General

The design of the 4TH6N and 4TH5 versions differs from that of the 4TH6. Thereby the force's deviations, which are felt when the lever is deflected, are reduced.

As the 4TH5 is smaller and lighter, it is normally used for applications in compact machines.

Function

When not actuated the control lever is held in zero position by the four return springs (8). The control ports (1, 2, 3, 4) are connected to the tank port **T** via the drilling (11).

With deflection of the control lever (5) the plunger (9) pushes against the return spring (8) and the control spring (7). The control spring (7) firstly moves the control spool (6) downwards and closes the connection between the appropriate port and tank port **T**. At the same time the appropriate port is connected to the port **P** via the drilling (11). The control phase begins as soon as the control spool (6) has found its balance between the force of the control spring (7) and the force which results from the hydraulic pressure in the appropriate port (ports 1, 2, 3 or 4).

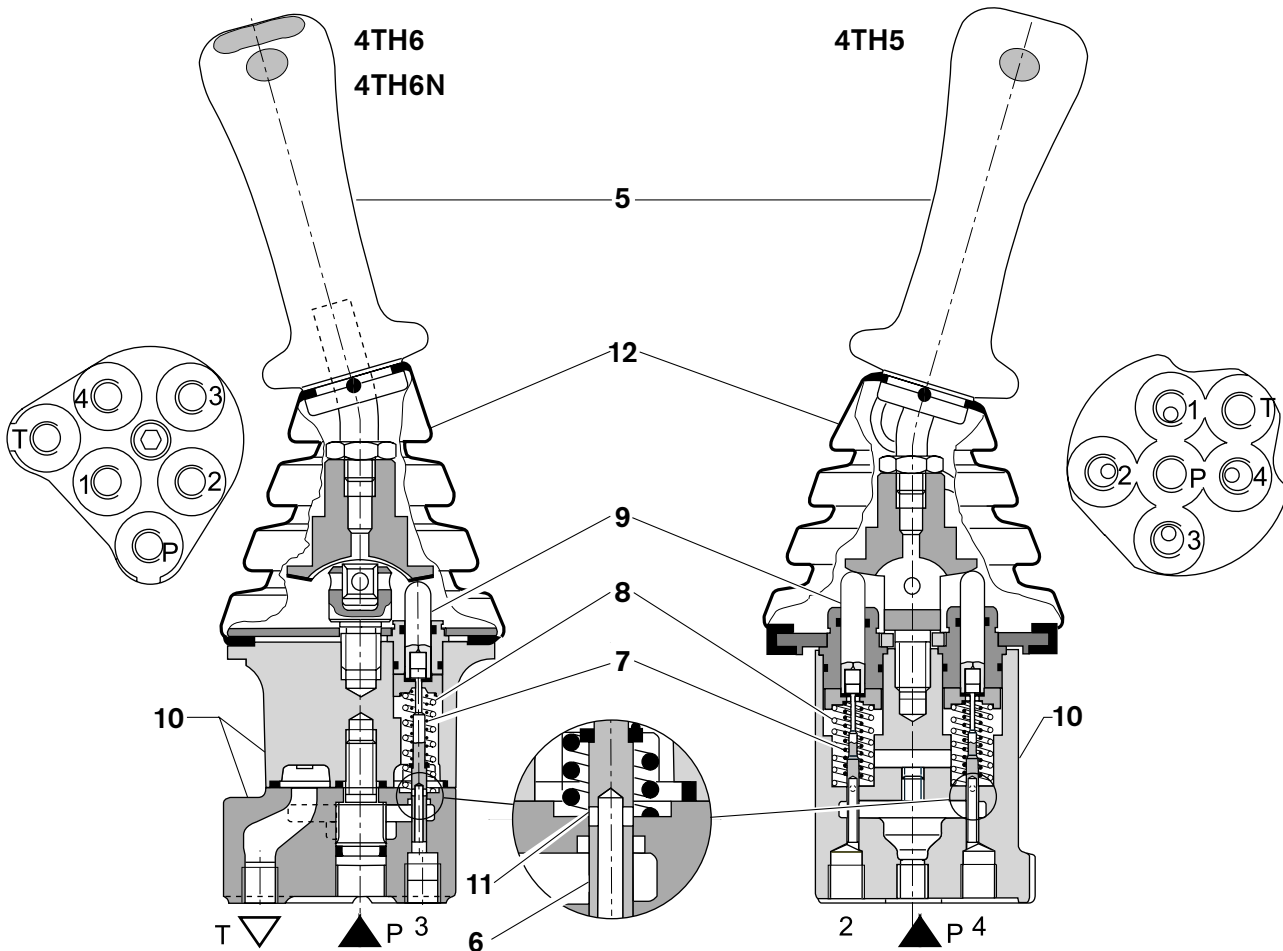
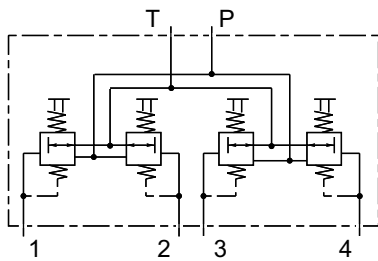
Through the interaction of control spool (6) and control spring (7) the pressure in the appropriate ports is proportional to the stroke of the plunger (9) and thus the position of the control lever (5).

A rubber boot (12) protects the mechanical components of the housing from contamination.

Ports

P	Supply
T	Tank
1, 2, 3, 4	Control ports

Hydraulic symbol

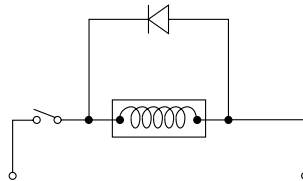


Technical data (for applications outside these parameters, please consult us!)


Mechanical		4TH6, 4TH6N	4TH5
Inlet pressure	bar	up to 50	up to 35
Back pressure at port T	bar	up to 3	
Pilot oil flow (P to 1 - 2 - 3 - 4)	l/mn	up to 16	up to 13
Pressure fluid		mineral oil (HL, HLP) to DIN 51524 ¹⁾	
¹⁾ suitable for NBR seals			
²⁾ suitable for FPM seals		phosphate ester (HFD-R) ²⁾	
Pressure fluid temperature range	°C	-20 to +80	
Viscosity range	mm ² /s	10 to 380	
Degree of pressure fluid contamination		to NAS 1638 class 9. We, therefore, recommend a filter with a minimum retention rate of $\beta_{10} \geq 75$	
Max. permissible operating torque at lever	Nm	10 during operation	
	Nm	80 with an exceptional, one time loading	
Weight	kg	approx. 2,6	approx. 1,9

Electrical

Technical data for the grips switch EC2000

• Switching capacity			
– minimal current	resistive load	100mA at 12VDC or 24VDC	
– maximal current	resistive load	5A at 12VDC or 24VDC	
• Microswitch lifetime			
– resistive load at 12VDC		100 to 500mA	5 millions cycles
		5A	300000 cycles
– resistive load at 24VDC		100 to 500mA	3 millions cycles
		5A	150000 cycles
– inductive load L/R=5ms at 12VDC or 24VDC		1,25A	200000 cycles
• Maximal contact resistance	m Ω	20	
• Switching on/off with low loads			
– minimum voltage	V	12	
– minimum current strength	mA	100	
• E-contact type		high current	
Grip protection		IP65	
Switching guidelines for DC voltages		<p>to ensure the service life of the electrical switch, we recommend the use of free-wheeling diodes that are switched parallel to the inductivity.</p> 	

Ordering details

		4 TH 5			- 1X /				*	
		4 TH 6								
Operating force deviations										
For 4 TH 5 :										
- Reduced		no code								
For 4 TH 6 :										
- Conventional		no code								
- Reduced		= N								
Grip range										
Ergonomic EC2000					= E					
Ergonomic EC4000					= H					
Ergonomic EC2000+					= I					
Ergonomic EC1000					= J ¹⁾					
Customer's					no code					
Without grip					= Z					
Control curve (see pages 6 and 7)		4TH6	4TH6N	4TH5						
Curve 06		•	•	•	06					
Curve 20		•			20					
Curve 70		•	•	•	70					
Curve 97		•	•		97					
Curve 106		•		•	106					
Different control curve: state identification No.		•								
Series 10 to 19 (10 to 19: unchanged installation and connection dimensions)					= 1X					
Type of ergonomic grip										
Grip type E (see page 8)					= TT, ST, VT, YT, YU					
Grip type H, I or J ¹⁾					see datasheet RE 64547					
Without grip					no code					
Grip orientation (see page 5)		4TH6	4TH6N	4TH5						
Lever straight, grip in the direction of control port 3		•	•		03					
Lever curved 15° in the direction of control port 4. Grip in the direction of control port 3		•	•	•	43					
Lever curved 15° in the direction of control port 2. Grip in the direction of control port 3		•	•	•	23					
Plugs (see page 9)		4TH6	4TH6N	4TH5						
DEUTSCH sealed plug IP 67 for wiring the grip		•	•	•	5					
Plug AMP MAT-N-LOK for wiring the grip		•	•		6					
Without plug		no code			•	•	•			
Seals type		4TH6	4TH6N	4TH5						
NBR seals  Attention! the compatibility of the seals and		•	•	•	M					
FPM seals pressure fluid has to be taken into account		•	•		V					
Connection threads		4TH6	4TH6N	4TH5						
Pipe thread to standard ISO 228/1		G 1/4	•	•	•	01				
Metric connections to standard ISO 9974		M 14 x 1,5	•			02				
Connections to standard JIS 2351			•		•	04				
UNF connections to standard ISO 11926		9/16 UNF-2B	•	•	•	05				
Further details in clear text										

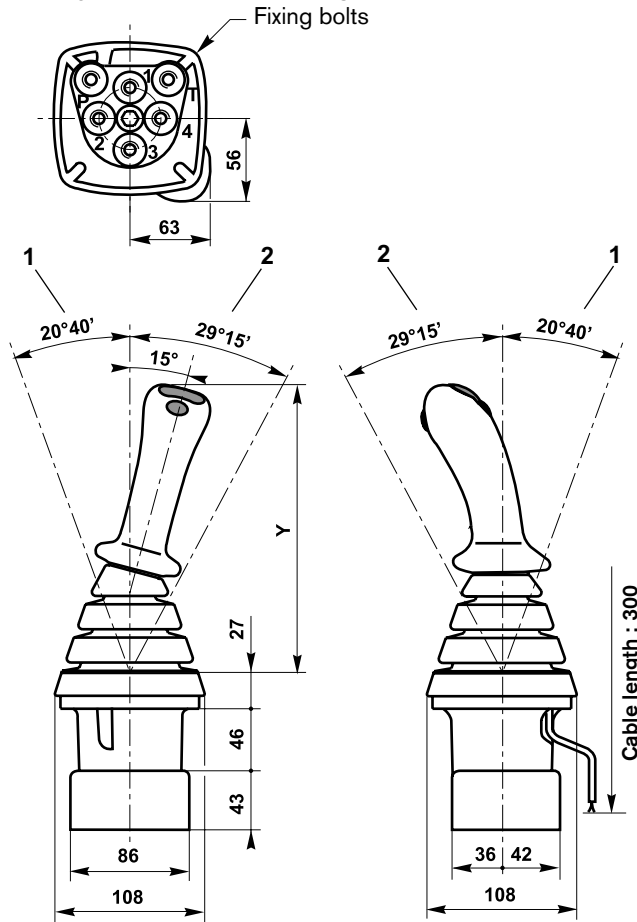
¹⁾ handle EC1000 for 4TH6 and 4TH6N only.

Unit dimensions (dimensions in mm)

Type designation of the pilot control units shown:

4 TH 6 E XX - 1X / - - 43 - - -

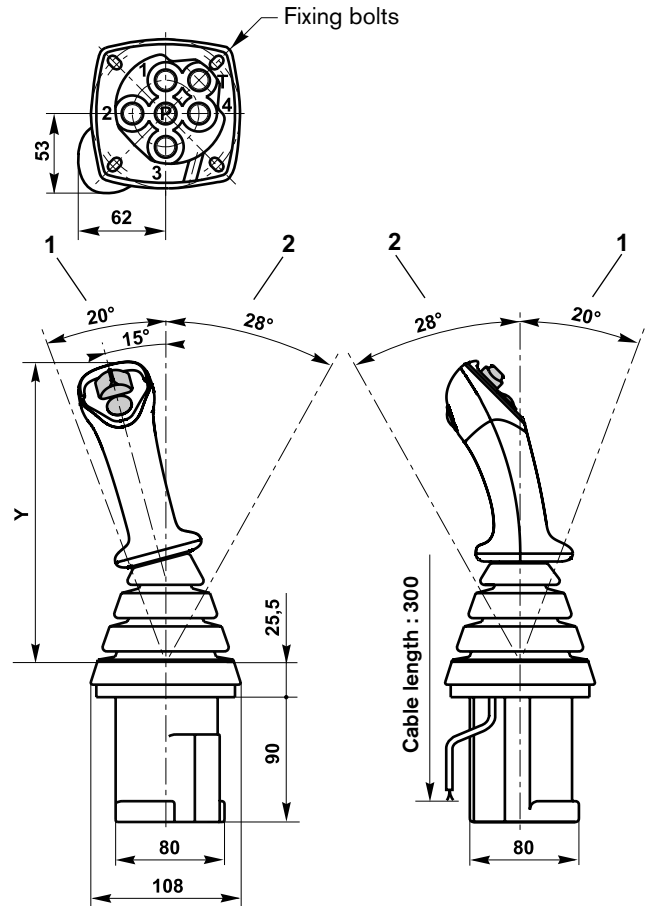
4 TH 6 N E XX - 1X / - - 43 - - -



- 1 Lever deflection when actuating 1 actuator.
- 2 Lever deflection when simultaneously actuating 2 actuators.

Type designation of the pilot control unit shown:

4 TH 5 I XX - 1X / - - 23 - - -



Unit dimension Y in function of the grip type :

type of grip	4TH6, 4TH6N	4TH5
EC1000	236	
EC2000	207	207,5
EC2000+	215	216,5
EC4000	251	248,5

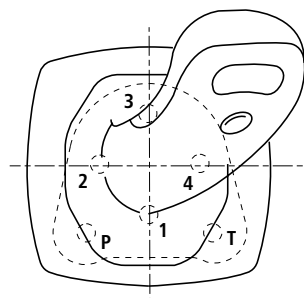
Orientation of the pilot control units at the driver's seat (viewed from above)

Pilot control unit left hand

4 TH 5 E XX - 1X / - - 43 - - -

4 TH 6 E XX - 1X / - - 43 - - -

4 TH 6 N E XX - 1X / - - 43 - - -

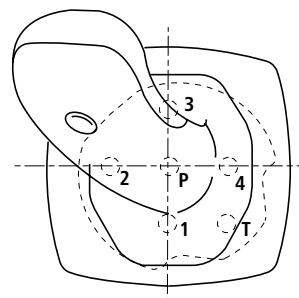


Pilot control unit right hand

4 TH 5 E XX - 1X / - - 23 - - -

4 TH 6 E XX - 1X / - - 23 - - -

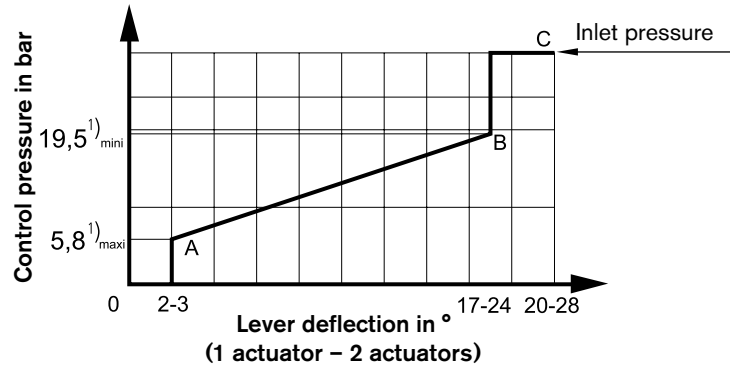
4 TH 6 N E XX - 1X / - - 23 - - -



Characteristic curves : control ranges, actuation moments

06 Control curve, identification No. 06

This curve is used for the pilot control of the SM12, SM18, M1, M6 control blocks

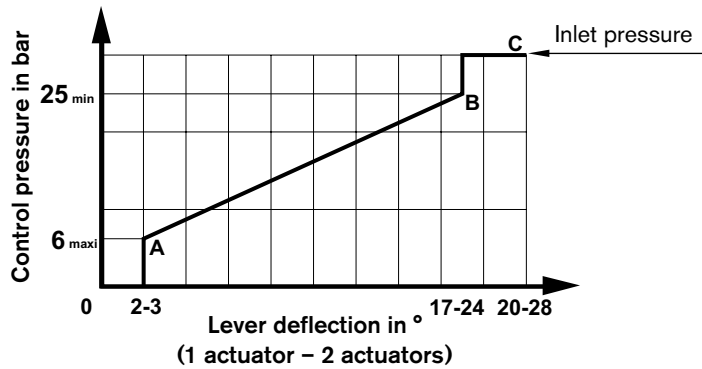


¹⁾ 4TH5 control pressure in bar : 5,9 maxi - 19 mini

	4TH6		4TH6N		4TH5		*p = 35 bar
	1	2	1	2	1	2	
No. of actuated actuators							
Operating torque in Nm	A	0,72	1,43	0,68	1,35	0,68	1,35
	B	1,99	3,99	1,46	2,92	1,45	2,90
	C	2,93*	5,86*	2,10	4,19	2,08	4,16

70 Control curve, identification No. 70

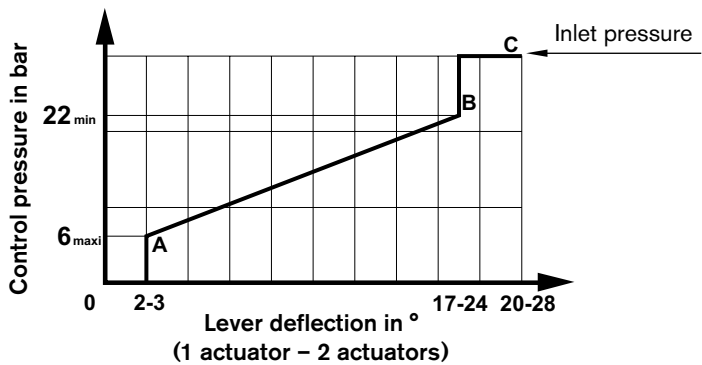
This curve is used for the pilot control of the SX12, SX14, SX18 control blocks



	4TH6		4TH6N		4TH5		*p = 35 bar
	1	2	1	2	1	2	
No. of actuated actuators							
Operating torque in Nm	A	0,73	1,45	0,68	1,37	0,69	1,37
	B	2,33	4,67	1,69	3,39	1,69	3,39
	C	2,93*	5,86*	2,10	4,19	2,08	4,16

106 Control curve, identification No. 106

This curve is used for the pilot control of the SM12 control blocks (application example : mini excavator)



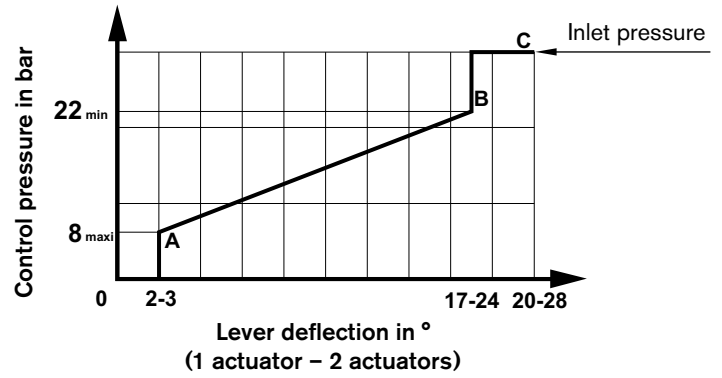
	4TH6		4TH5		*p = 35 bar
	1	2	1	2	
No. of actuated actuators					
Operating torque in Nm	A	0,72	1,44	0,68	1,36
	B	2,17	4,34	1,58	3,15
	C	2,93*	5,86*	2,08	4,16

The operating torques stated are theoretical values which do not take into account the rubber boot resistance.

Characteristic curves : control ranges, actuation moments

20 Control curve, identification No. 20

This curve is used for the pilot control of the SP12 control blocks

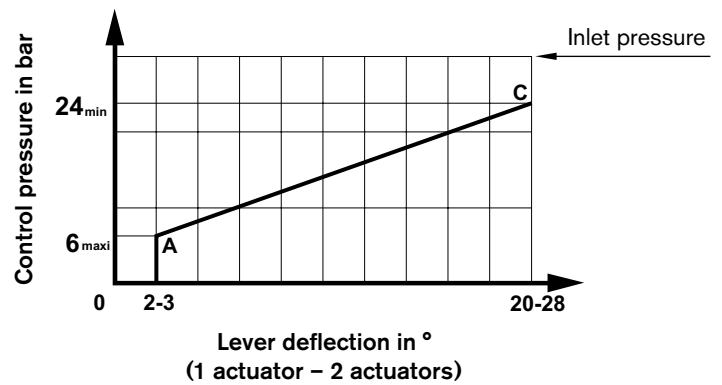


No. of actuated actuators	4TH6		
	1	2	
Operating torque in Nm	A	0,83	1,65
	B	2,21	4,42
	C	2,93*	5,86*

*p = 35 bar

97 Control curve, identification No. 97

This curve is used for the pilot control of the M7, M4 control blocks



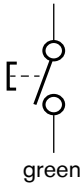


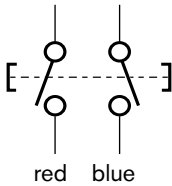


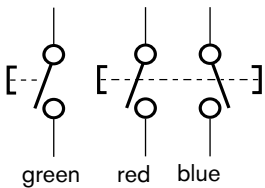


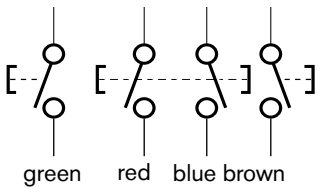



No. of actuated actuators	4TH6		4TH6N		
	1	2	1	2	
Operating torque in Nm	A	0,72	1,44	0,68	1,36
	C	2,45*	4,91*	1,77	3,53

*p = 35 bar

The operating torques stated are theoretical values which do not take into account the rubber boot resistance.

Variations of ergonomic grip EC2000

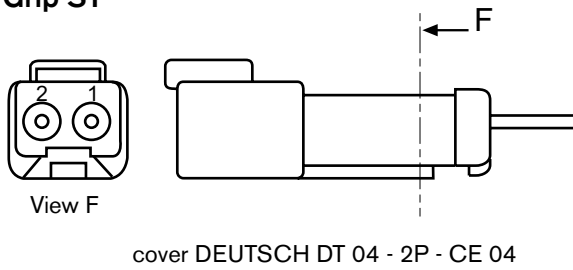
<p>TT</p> 	<p>– without E-contact</p>	
<p>ST</p> 	<p>– single E-contact on top</p>	<p>yellow</p>  <p>green</p> 
<p>VT</p> 	<p>– double E-contact with rocker switch</p>	<p>black grey</p>  <p>red blue</p> 
<p>YT</p> 	<p>– double E-contact with rocker switch – single E-contact on top</p>	<p>yellow black grey</p>  <p>green red blue</p> 
<p>YU</p> 	<p>– double E-contact with rocker switch – single E-contact on top – single E-contact to the front</p>	<p>yellow black grey white</p>  <p>green red blue brown</p> 

Contact location within the plugs for wiring grip EC2000

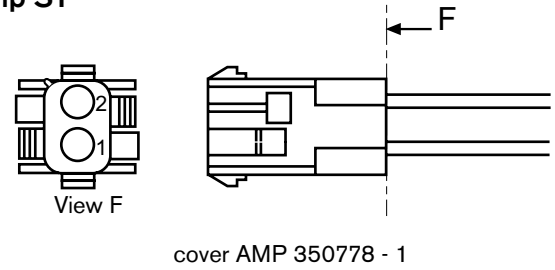
DEUTSCH sealed plug IP 67 (ordering detail = 5)

Plug AMP MAT-N-LOCK (ordering detail = 6)

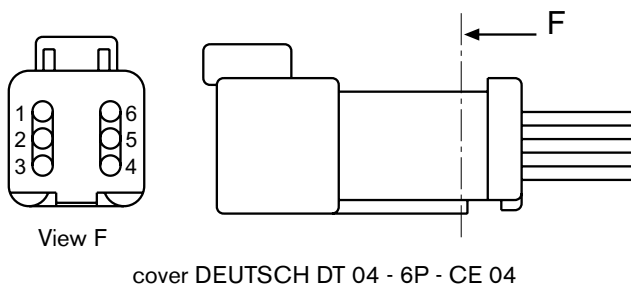
Grip ST



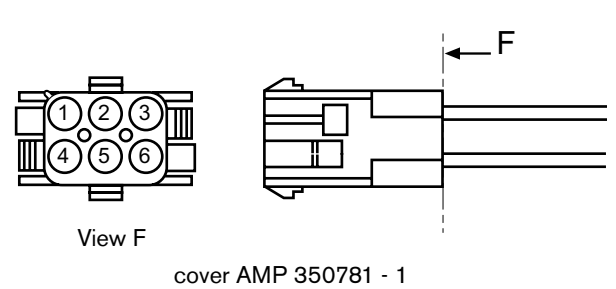
Grip ST



Grip VT or YT



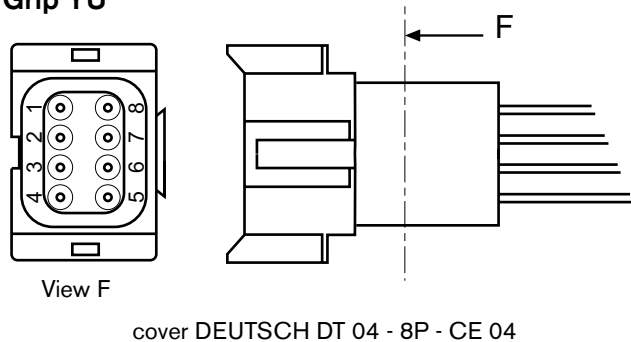
Grip VT or YT



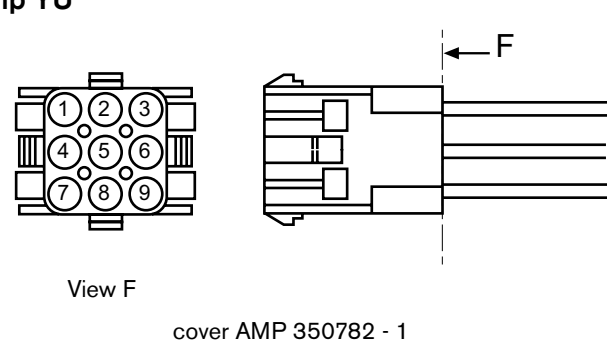
Identification in the plug	wire colour	Ergonomic grip type	
		VT	YT
1	red	X	X
2	black	X	X
3	grey	X	X
4	blue	X	X
5	yellow		X
6	green		X

Identification in the plug	wire colour	Ergonomic grip type	
		VT	YT
1	grey	X	X
2	black	X	X
3	red	X	X
4	blue	X	X
5	yellow		X
6	green		X

Grip YU



Grip YU



Identification in the plug	wire colour	identification in the plug	wire colour
1	red	5	yellow
2	black	6	green
3	grey	7	white
4	blue	8	brown

Identification in the plug	wire colour	identification in the plug	wire colour
1	grey	5	yellow
2	black	6	green
3	red	7	white
4	blue	8	brown

Application guidelines (these guidelines are not intended to be considered as complete)

- Do not direct the jet of a pressure washing unit directly at the unit.
- The electrical cable must be kept free of any mechanical forces.
- During operation protection via the rubber boot must be ensured.
- Only use the unit with its original grip and lever.
- Ensure that the inertia data of the original grip are not exceeded.
- Replace worn push buttons, so that the integrity of the EC2000 grip is ensured.

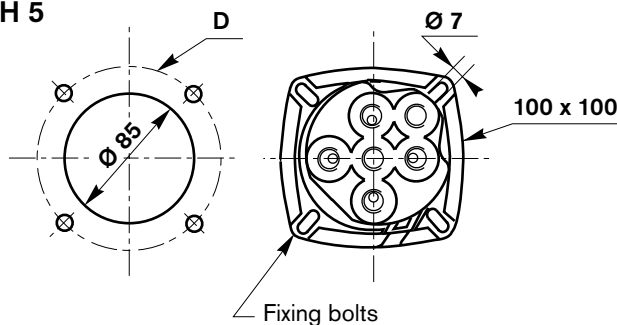
Safety guidelines (these guidelines are not intended to be considered as complete)

- Only one function control must be allocated to an E-contact.
- The circuit functions are to be so designed that uncontrolled machine movements caused by the application are prevented and that it is possible to switch from one function to another.
- Take into account all of the application limits, particularly those application limits stated within this catalogue sheet.
- Preparation for assembly and testing on the machine: The various checks must include all the functions of the pilot control device.

Installation guidelines 4TH6, 4TH6N, 4TH5

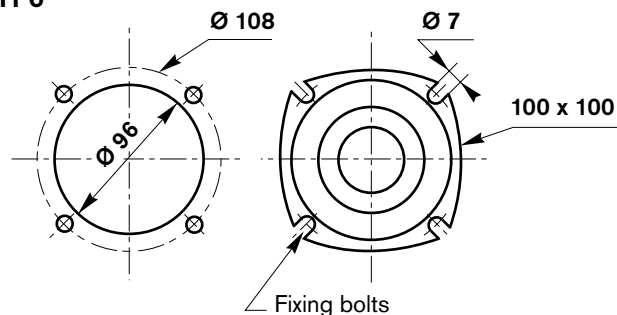
- Mounting flange area: Flatness = 0.5 mm
- Screw head dimensions = \varnothing 10 mm
- Tightening torque for the flange fixing screws = Max. 10 Nm
- Tightening torque for the pipe connections = Max. 30 Nm

Installation hole 4 TH 5



- Nominal diameter / fixing via 4 screws
D = 92 to 100 mm or 100 to 108 mm

Installation hole 4 TH 6



- \varnothing 108 = Nominal diameter / fixing via 4 screws

Notes

Notes

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Subject to revision.