

Pilot control unit with end position lock for the remote control of directional valves

RE 64 553/02.07 1/12

Replaces : 05.05

Type 4THF6 or 5THF6

Series 2X



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Features

- Progressive, sensitive operation.
- Precise and play-free control.
- Low actuation forces at lever.
- Several ergonomic grips with various E contacts (design patents).
- Electro-magnetic end position lock at each control port (the control lever does not have to be held in its deflected position).
The electro-magnetic lock may be released by operating a switch on the machine.
- Possible 5th hydraulic control port for additional functions (e.g. control of float position).
- One or more type THF6 pilot oil units can be directly flanged on to the 2 TH 6 housing (single axis model, sandwich plate design to RE 64 552) (pipe and space saving combination – optimum for the mounting of auxiliary proportional controls).
- Noticeable resistance point when operating close to the lever end position (summation of progressive force), hence providing a warning just before the changeover occurs to the locked position or float position (prevention of accidental operation).

Functional description, section, symbol

Hydraulic function principle

The pilot control units with end position locks type THF6 operate on the basis of direct actuated pressure reducing valves. They basically comprise of control lever (1), four pressure reducing valves, a housing (6) and locks.

Each pressure reducing valve comprises of a control spool (2), a control spring (3), a return spring (4) and a plunger (5).

At rest, control lever (1) is held in its neutral position by return springs (4). Ports (1, 2, 3, 4) are connected to tank port T via drilling (8).

When the control lever (1) is deflected, plunger (5) is pressed against return spring (4) and control spring (3). Control spring (3) initially moves the control spool (2) downwards and closes the connection between the relevant port and tank port T. At the same time the relevant port is connected to port P via drilling (8). The control phase starts as soon as control spool (2) finds its balance between the force from control spring (3) and the force, which results from the hydraulic pressure in the relevant port (ports 1, 2, 3 or 4).

Due to the interaction between control spool (2) and control spring (3) the pressure in the relevant ports is proportional to the stroke of plunger (5) and hence to the position of control lever (1). This pressure control which is dependent on the position of the control lever and the characteristics of the control spring permits the proportional hydraulic control of directional valves and high response valves for hydraulic pumps and motors.

A rubber boot (9) protects the mechanical components in the housing from contamination, therefore, these pilot control units are suitable for even the most unfavourable operating conditions.

End position lock

Only those control ports, for which it is necessary to hold the control lever in a deflected position are equipped with end position locks.

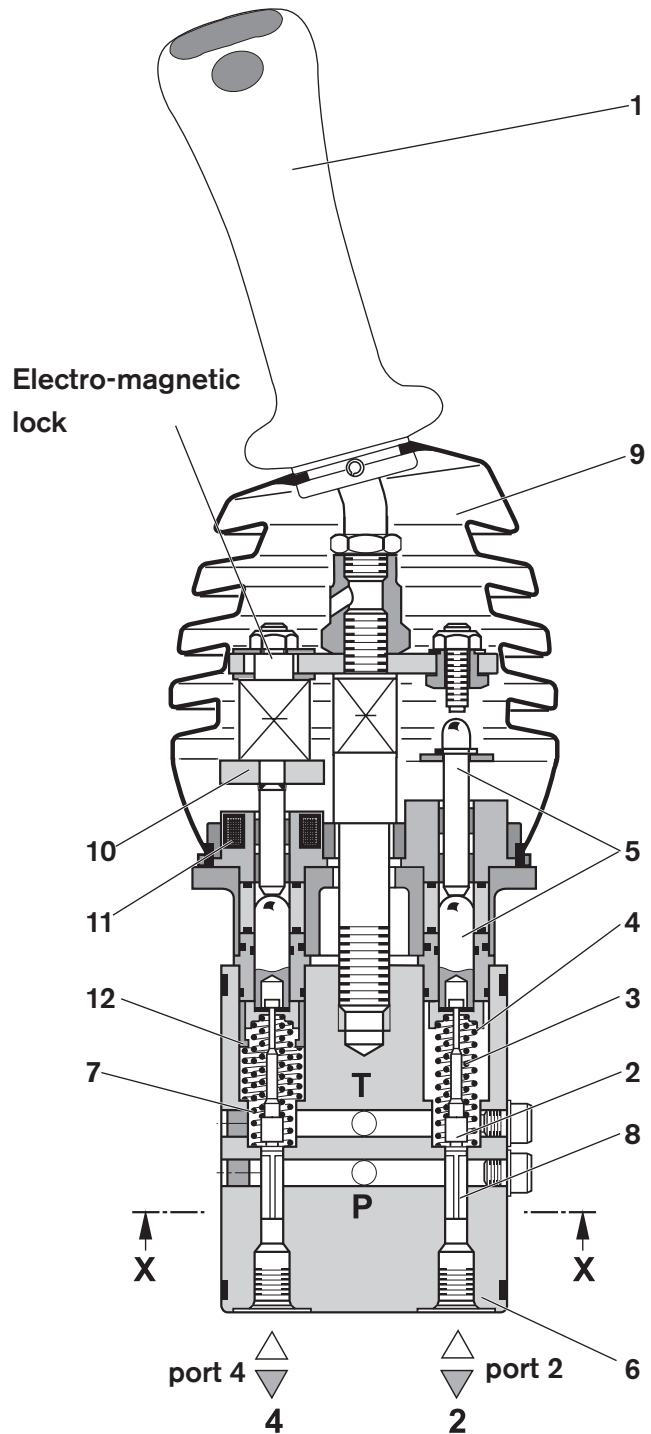
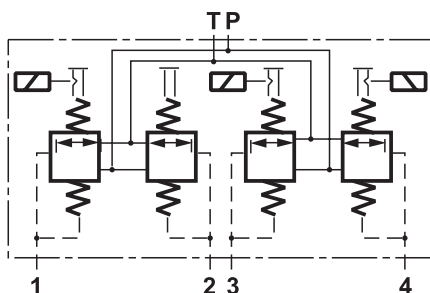
Electro-magnetic lock

An additional spring (7), which is fitted below an additional plate (12) warns, by means of an increased force, which is required for compressing this spring, that the plunger (5) and the control lever (1) have almost reached their end position.

When this threshold is overcome, a ring (10) contacts the solenoid armature (11); if the solenoid is energised, then control lever (1) is held in its end position by magnetic force.

This lock is released automatically when the solenoid is de-energised.

Symbol for the 4 THF 6 with 3 electro-magnetic locks



Functional description, section, symbol

Fifth control port (type 5 THF 6...)

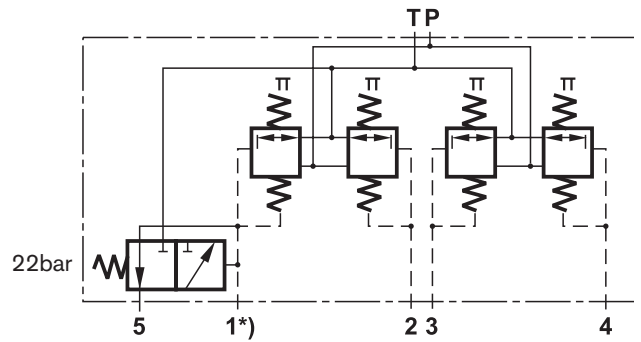
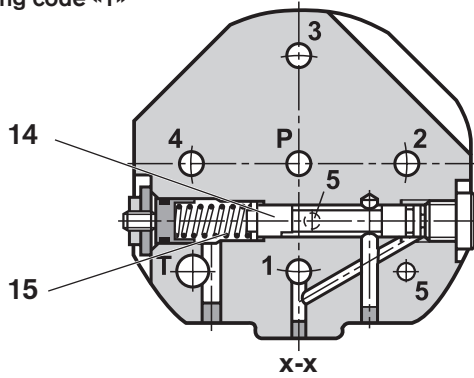
Model 5THF6 is equipped with a fifth control port, which is used to control an auxiliary function. This function may be operated by moving spool (14) against spring (15) under the influence of the pressure acting in port 1.

As soon as this pressure reaches 22 bar, control port 5 is connected with either T, P or control port 1, depending on the circuit required (see symbols).

Ordering code «1»

1 i 5

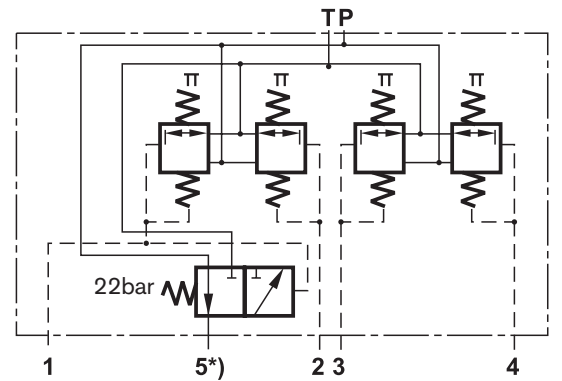
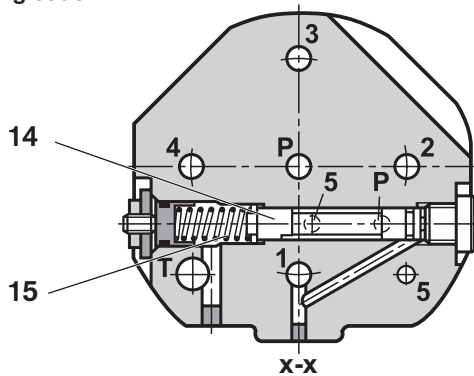
5 i T



Ordering code «2»

P i 5

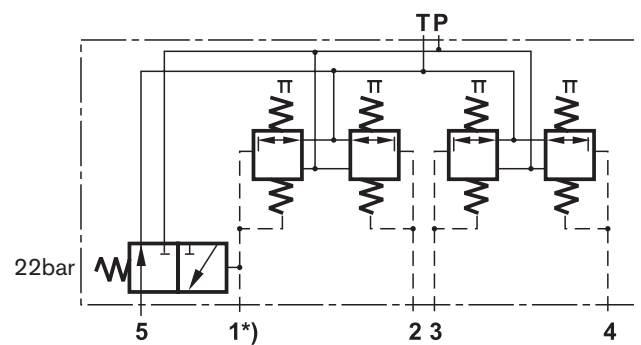
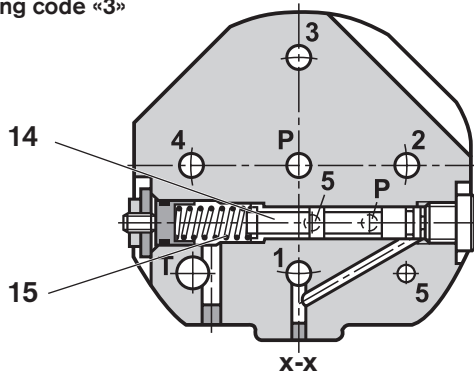
5 i T



Ordering code «3»

5 i T

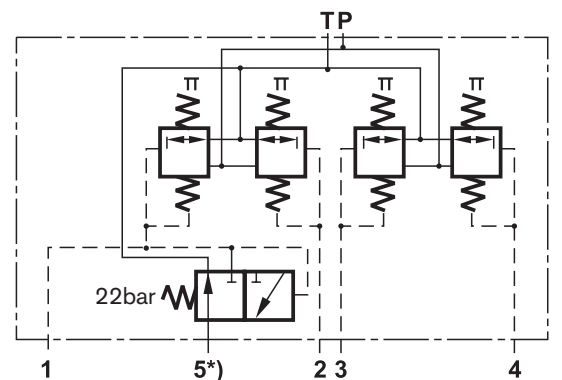
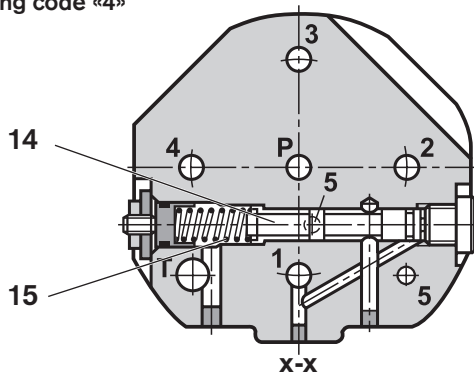
P i 5



Ordering code «4»

5 i T

1 i 5

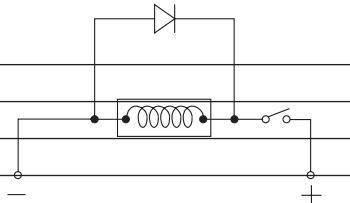


*) float position



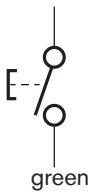


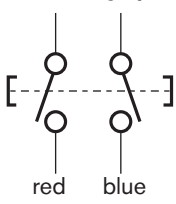


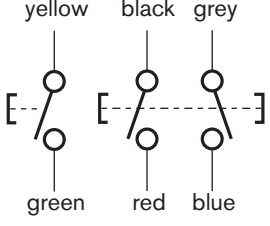



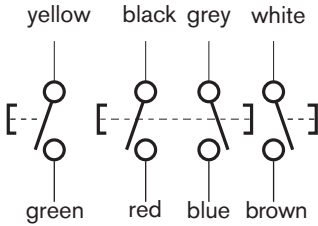



Technical data, mechanical (for applications outside these parameters, please consult us!)

Back pressure at port T	bar	Up to 3
Pilot oil flow (P to 1 - 2 - 3 - 4)	l/min	Up to 16
Pressure fluid		Mineral oil (HL, HLP) to DIN 51524 ¹⁾ Phosphate ester (HFD-R) ²⁾
¹⁾ suitable for NBR seals		
²⁾ suitable for FKM seals		
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, version 4THF6	kg	Approx. 5.7

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

Technical data for the grip 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 5A	5 millions cycles 300000 cycles
–resistive load at 24VDC	100 to 500mA 5A	3 millions cycles 150000 cycles
–inductive load L/R=5ms at 12VDC or 24VDC	1,25A	200000 cycles
• Maximal contact resistance	mΩ	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		to ensure the service life of the electrical switch, we recommend the use of free-wheeling diodes that are switched parallel to the inductivity.
		
• Power supply for the locking solenoids		12 V (9 to 15) and 24 V (20 to 27) / DC
• Max. power consumption of each solenoid		8 W at 12 VDC or 24VDC

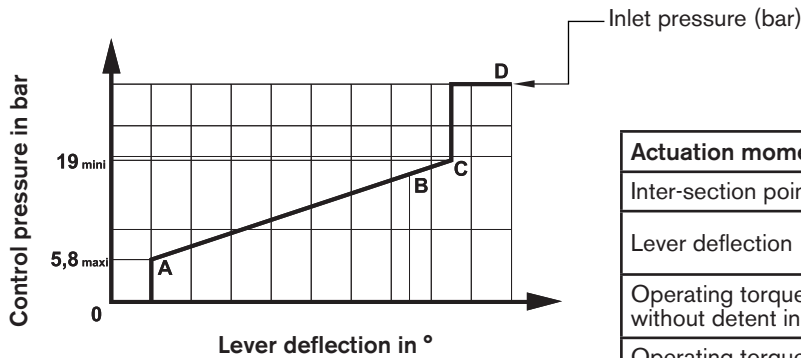
Variations of ergonomic grip EC2000

<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>   

Characteristic curve: 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

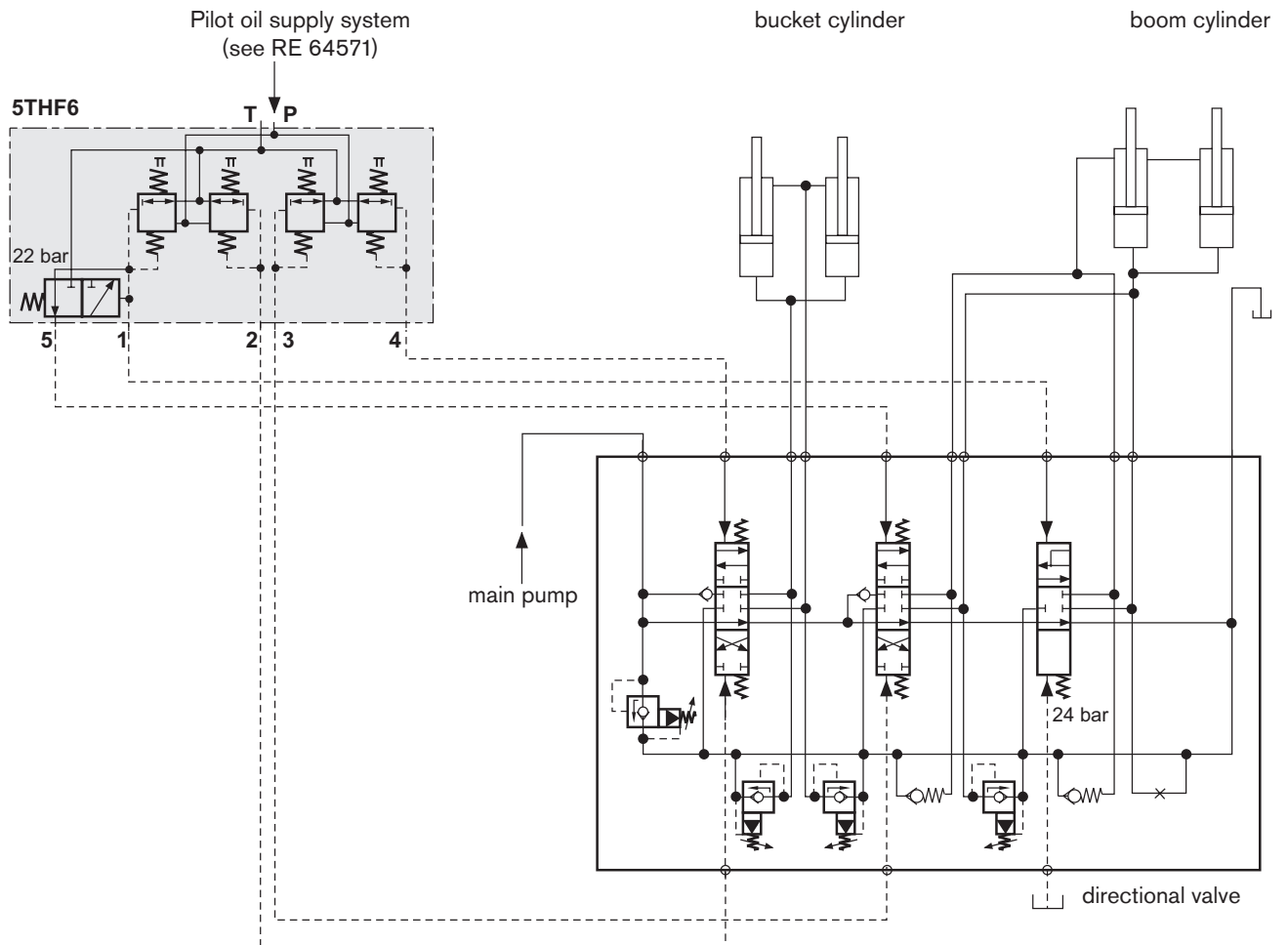


Actuation moments of 1 actuator				
Inter-section point	A	B	C	D
Lever deflection	2°	13°	14°	17°
Operating torque without detent in N.m	0,9		3,2	3,7 (p = 35 bar)
Operating torque with detent in N.m	0,9	4,5	4,8	6 (p = 35 bar)

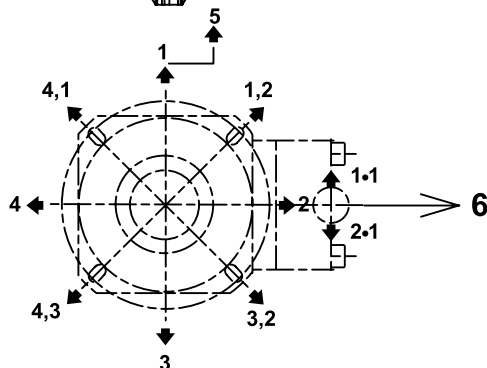
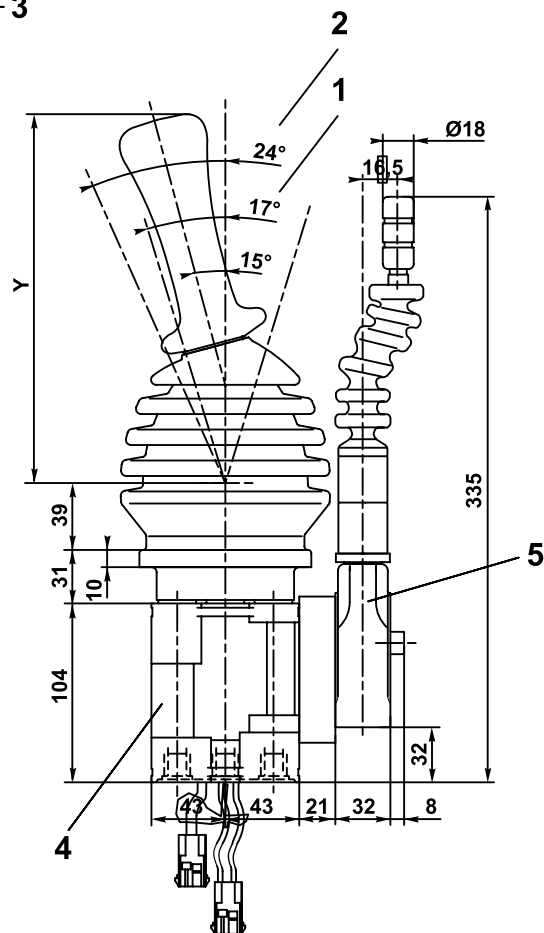
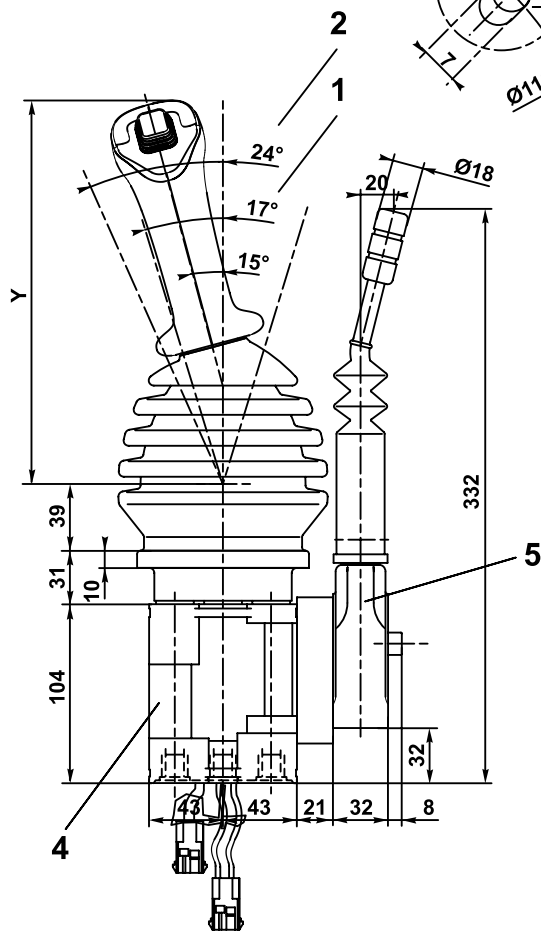
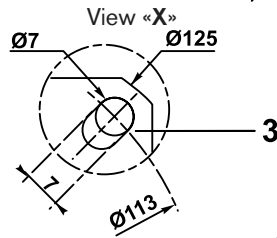
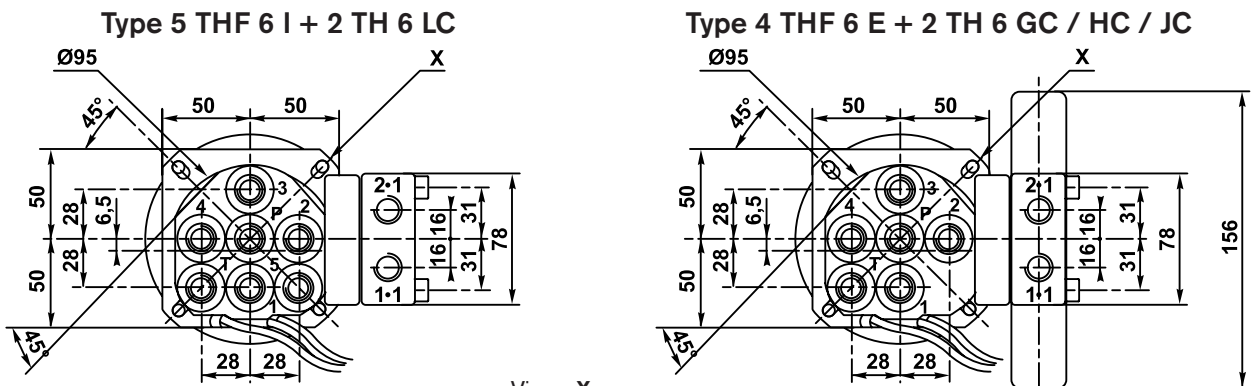
B = Resistance point before changeover to inlet pressure

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

Circuit example



Unit dimensions (dimensions in mm)



- 1 lever deflection when operating one actuator
- 2 lever deflection when operating two actuators
- 3 four equally space mounting points
- 4 THF 6
- 5 2TH 6
- 6 lever actuation direction and control ports thereby influenced

Unit dimension in function of the grip type:

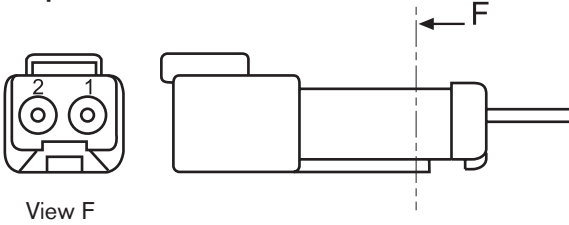
type of grip	Y
EC2000	211
EC2000+	226
EC4000	261

The THF 6 variants are supplied without fixing screws

Contact location within the plugs for wiring grip EC2000

DEUTSCH sealed plug IP 67
(ordering detail = 5)

Grip ST

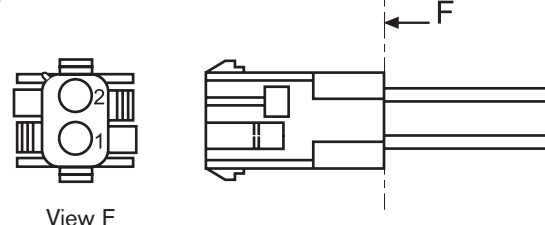


View F

cover DEUTSCH DT 04 - 2P - CE 04

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

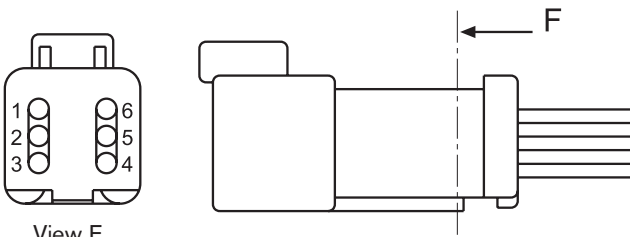
Grip ST



View F

cover AMP 350778 - 1

Grip VT or YT

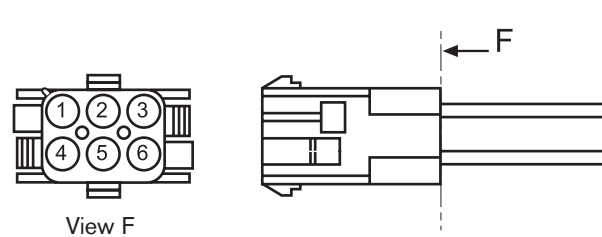


View F

cover DEUTSCH DT 04 - 6P - CE 04

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

Grip VT or YT

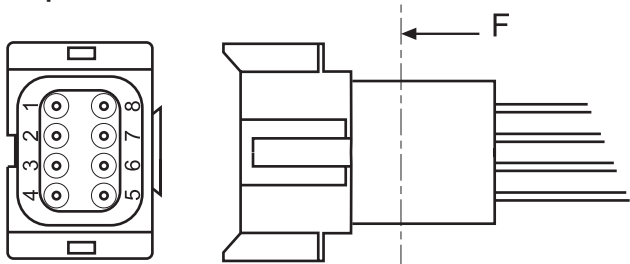


View F

cover AMP 350781 - 1

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

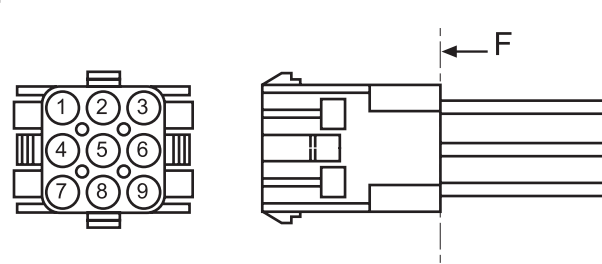


View F

cover DEUTSCH DT 04 - 8P - CE 04

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

Grip YU



View F

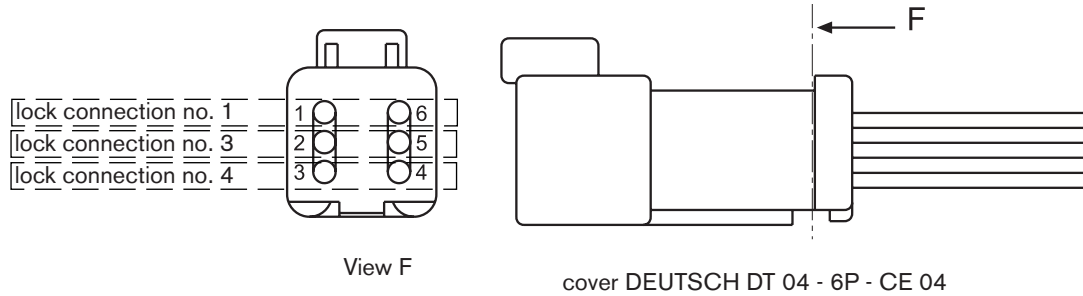
cover AMP 350782 - 1

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

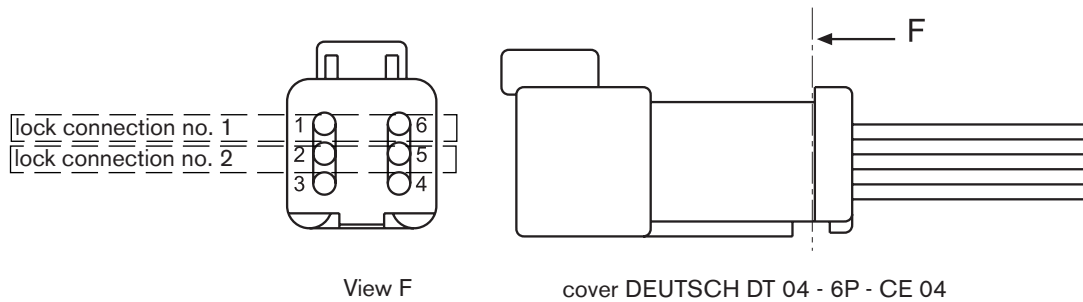
Contact location within the plugs for wiring the solenoids of the electro-magnetic lock

DEUTSCH sealed plug IP 67 (ordering code = 5)

- Plug for wiring the 4/5 THF 6 electro-magnetic lock solenoids

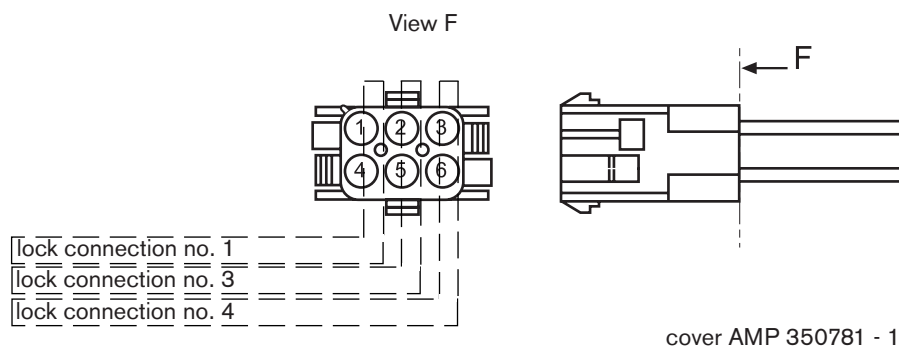


- Plug for wiring the 2 TH 6 GC / HC / JC electro-magnetic lock solenoids

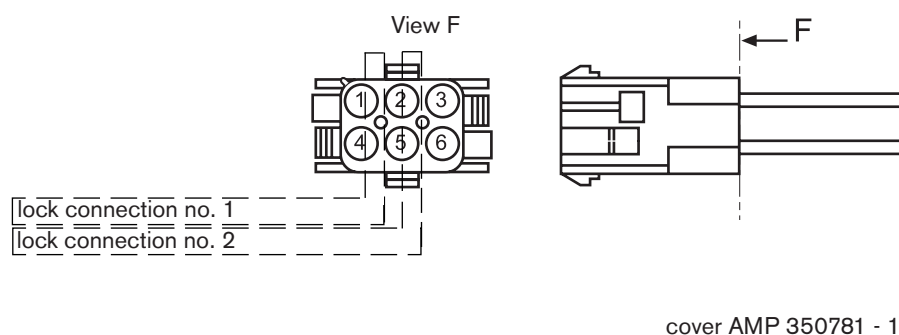


Plug AMP MAT-N-LOK (ordering code = 6)

- Plug for wiring the 4/5 THF 6 electro-magnetic lock solenoids



- Plug for wiring the 2 TH 6 GC / HC / JC electro-magnetic lock solenoids



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 grommet 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 grip EC2000 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

- Mounting flange area: Flatness = 0.5 mm
- Screw head imensions = Ø10 mm
- Tightening torque for the flange fixing screws = Max. 10 Nm
- Tightening torque for the pipe connections = Max. 30 Nm
- Before fitting the grip to a THF6Z variant use a centralising bush to hold the cardan pin, so that the cardan joint is not damaged. Also see the description in the spare parts list RDEF 64 553-E

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Subject to revision.