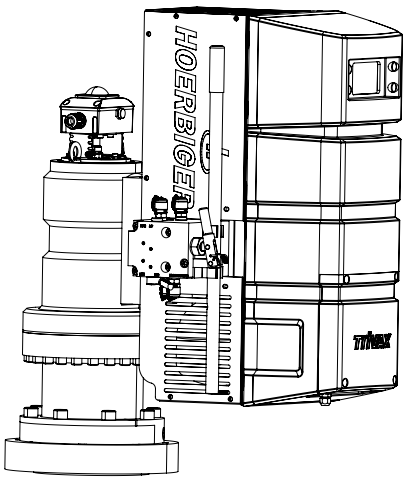
TriVAX® Plus Helical

Operating angle 90°

Technical data

HOERBIGER
because performance counts



“OUR TRIVAX VALVE ACTUATOR HAS A PIPING-FREE DESIGN WITH A CLOSED AND PRECHARGED HYDRAULIC SYSTEM WHICH MAKES IT UNIQUE. THEREBY WE PROVIDE A COMPACT DESIGN, LOWEST MAINTENANCE COSTS AND A VERY SIMPLE AND QUICK INSTALLATION.”

GOTTHARD GAWENS, GLOBAL PRODUCT MANAGER TRIVAX

TriVAX® Plus Helical

Smart valve actuator 90°

The TriVAX valve actuation concept from HOERBIGER combines the advantages of the existing valve actuation systems. As it is an electric actuator with fluidic gear, it is easy to install, doesn't need any other power infrastructure than the electric, includes an integrated operating and diagnostic tool and has the opportunity to integrate safety functions or quick operation features very easily. Due to tubeless construction potential leakages are avoided.

TriVAX 6200 is a helical-quarter-turn actuator, which is especially suitable for limited installation space due to its compact design. Quarter turn valves, i.e. butterfly, ball or plug valves, can be operated in On/ Off mode (TriVAX 6100 or TriVAX 6200) or in positioning mode (TriVAX 6300). There are double acting and single acting versions available. The operating torques for double acting actuators are in the range of 2 to 16,7 kNm, while the single acting actuators are able to apply spring ending torques from 2,2 to 12,5 kNm. Extensive diagnostic functionalities enables the analysis of actuator, valve and process.

TriVAX is suitable for hazardous areas with a needed protection level up to ATEX II 2 G/D Ex de IIB T4. The standard weather protection is IP65 and optional IP67.

TriVAX is an integrated actuator unit which incorporates a hydraulic quarter turn actuator which is driven by an electro-hydraulic high pressure power unit and controlled by an electronic control unit with intuitive human machine interface.

Features:

- Completely closed hydraulic system
- Compact design
- Tubeless architecture
- Easy integrable safety functions (Fail-Safe / ESD)
- Simple installation
- Flexible application possibilities
- Small electric power consumption
- Separate terminal compartment
- Modular construction

Customer benefits:

- Install & Perform – simple installation and intuitive handling
- Reliable and efficient operation
- Flexible application possibilities with one product plattform

CHARACTERISTICS

Operating voltage	3 ph / 400 V / 50 Hz or 1 ph / 230 V / 50 Hz		or 3 ph / 480 V / 60 Hz
Tolerances	Voltage ± 10 % – Frequency: ± 5 %		
Max. current	3 ph / 400 V: 4,8 A	1 ph / 230 V: 7,8 A	3 ph / 480 V: 3,9 A
Nominal current (@ 50 % load)	3 ph / 400 V: 2,2 A	1 ph / 230 V: 3,2 A	3 ph / 480 V: 2,2 A
Recommended fuse	3 ph / 400 V: 6 A	1 ph / 230 V: 10 A	3 ph / 480 V: 6 A
Tripping characteristic	B		
Min. breaking capacity	1,5 kA		
Power consumption	1100 W		
Position accuracy	± 2 % of full stroke		
Ambient temperature	–25°...70 °C velocity reduction at temp. > 65 °C possible Option: –30°C...+60 °C		
Protection class	IP 65		
Explosion protection	ATEX II2G/D Ex de IIB T4 / IP67 IEC-Ex: Ex de IIB T4 / IP67 cCSAus: Ex d e [ib] ib IIB T4 Gb Class I, Zone 1 AEx d e [ib] ib IIB T4 Gb		
Corrosion protection	DIN EN ISO 12944-2 category C3 (medium), optional: C5M (very high – marine)		
Manual operation	Hand pump (optional)		
Mounting position	Each position possible (at outside mounting: Display NOT on top side)		

IN-/OUTPUTS

TriVAX® PLUS Helical 90°

IN-/OUTPUTS DIGITAL

DIGITAL INPUT

DI1 – DI4 (Ex e)	Signal „0“: 0 – 11 VDC Signal „1“: 15 – 30 VDC Nominal current 5 mA – load: 4,8 kΩ External voltage (24 VDC) with common ground for DI1 – DI4	

DIGITAL OUTPUT

DO1 – DO4 (Ex e)	Solid state – high-side switch Signal „0“: 0 V Signal „1“: 24 V Nominal current: 5 mA Short circuit current: 80 mA max. load: 300 Ω External voltage (common for DO1 – DO4): 20 – 30 VDC (typ. 24 V)	Per parameter configuration for the selected event as active „0“ or active „1“ programmable
DO5 – DO7 (Ex e)	Relay contact MAKE Nominal voltage: 24 VDC max. current: 1 A min. switching power: 500 mW (10 V / 5 mA)	Per parameter configuration for the selected event as active „0“ or active „1“ programmable

IN-/OUTPUTS ANALOGUE (TRIVAX 6200 AND 6300 ONLY)

ANALOGUE INPUT

AI1 (Ex i) – Set point position AI2 (Ex i) – Set point speed	**Max. values for connectable Ex i equipment** No-load voltage U_i: 30 V Short circuit current I_i: 200 mA Power P_i: 1,5 W Capacity C_i: 5,2 nF Inductivity L_i: 0	Current: 4 – 20 mA Voltage: 7…30 V DC Load: 350 Ω

ANALOGUE OUTPUT (TRIVAX 6300 ONLY)

Analogue Output AO1 (Ex i) – Position retransmission	**Max. values for connectable Ex i equipment** No-load voltage U_i: 30 V Short circuit current I_i: 130 mA Power P_i: 980 mW Capacity C_i: 5,2 nF Inductivity L_i: 0	Current: 4 – 20 mA Voltage: 7…30 V DC Load: 350 Ω (passive output)

INPUT ESD

DIGITAL INPUT ESD

Digital Input ESD IN (Ex e) This input can be disabled by HOERBIGER at double acting actuators.	Signal „0“: 0 VDC Signal „1“: 24 VDC (Min. ext. switching voltage 24 VDC) Nominal current: 38 mA	A LOW Signal at ESD IN (Signal „0“) moves the actuator to its safety position (Hold Position/ Spring return) and it doesn’t react on other control signals.

ACTUATOR SIZES

TriVAX® PLUS Helical 90°

ACTUATOR SIZE	6XX1	6XX2	6XX3	6XX4	6XX5
Operating angle	90°	90°	90°	90°	90°
DOUBLE ACTING					
Torque	2000 Nm	4000 Nm	8100 Nm	12000 Nm	16700 Nm
Operating velocity	14 °/s	7,4 °/s	3,9 °/s	2,4 °/s	1,8 °/s
SINGLE ACTING					
Operating torque (spring ending torque)	2200 Nm	4000 Nm	6000 Nm	8300 Nm	12500 Nm
Op. torque (oil starting torque)	3700 Nm	7900 Nm	10450 Nm	14000 Nm	16550 Nm
Operating velocity – standard	4,9 °/s	2,5 °/s	1,8 °/s	1,35 °/s	1 °/s
Op. velocity – quick acting / FS	180 °/s	80 °/s	80 °/s	50 °/s	40 °/s

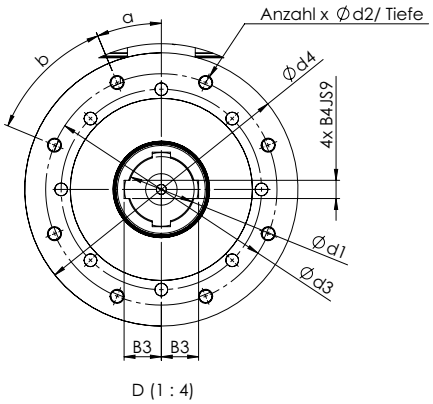
Note: For versions with operating voltage 1 ph / 230 V the operating velocities are reduced to 50 % of the stated values.

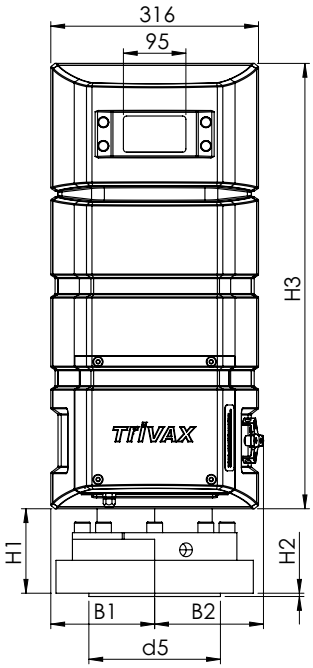
On request: Helical actuators available with torque up to 32,000 Nm

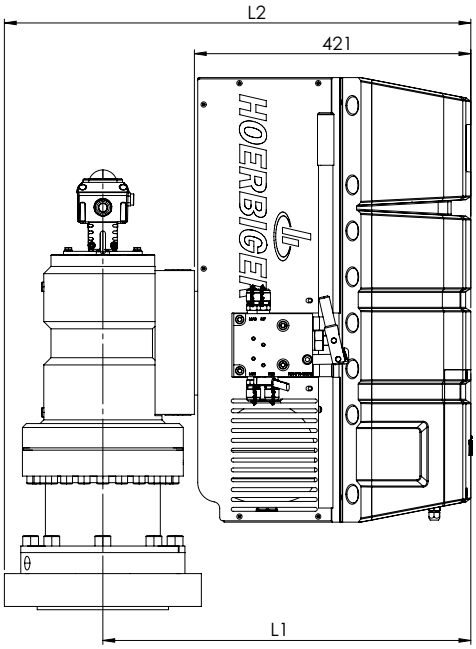
CONTROL CONFIGURATION	6100 SIMPLE ON/OFF	6200 SMART ON/OFF	6300 SMART POSITIONING
Functional scope	OPEN / CLOSE	OPEN / CLOSE	Positioning
Duty cycle	S3 – 10 %	S3 – 10 %	S3 – 25 %
Position accuracy			± 2 % of full stroke
Intuitive human machine interface	✓	✓	✓
Digital In-/Outputs	✓	✓	✓
Digital Inputs	4 (24 VDC) configurable for Latched operation, Push-to-run operation or 2-wire control		
Digital Outputs	4 solid state outputs 24 V DC high side configurable as HIGH or LOW output for status signals		
Digital Outputs – voltfree	3 voltfree relay contacts configurable as MAKE or BREAK contacts for status signals		
Analogue Inputs	–	1 analogue input for threshold control position	2 analogue inputs for set point position and speed
Analogue Output	–	–	1 analogue output for position retransmission
Position detection	✓	✓	✓
Manual operation	Option	Option	Option
Ex proof (ATEX)	Option	Option	Option

DIMENSIONS DOUBLE ACTING ACTUATORS

TriVAX® PLUS Helical 90°



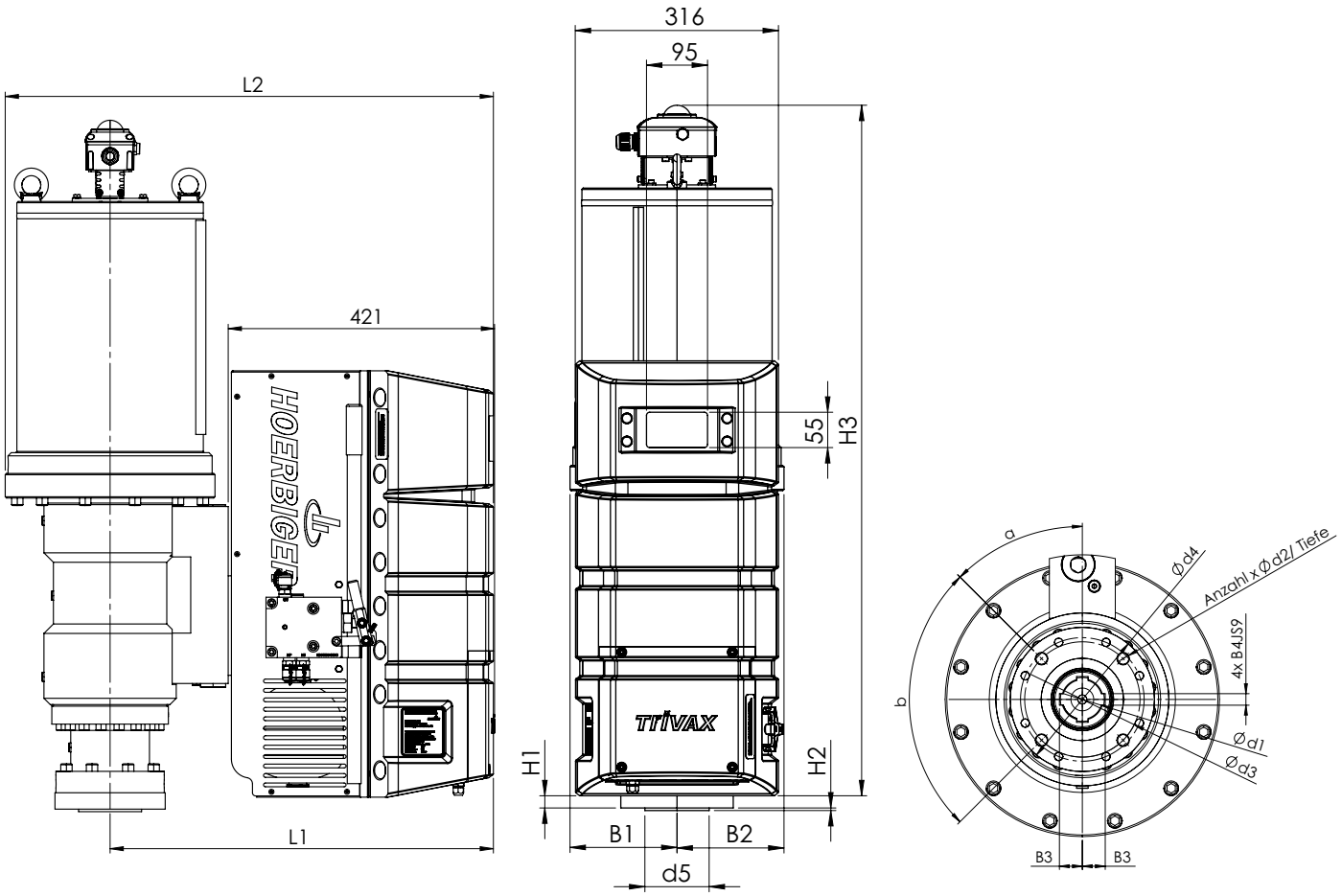




Size	Max. torque	H1	H3	B1	B2	B3	L1	L2	Ø d1 x depth	Ø d2 x depth	Ø d3	4xB4	a	b	Weight
	[kN]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[°]	[°]	[kg]
6x11	2000	20	677	158	166	27,8	545	635	48 x 70	4 x M16 x 26	F14 140	14	45	3 x 90	140
6x12	4000	62		158	166	34,4	557	654	60 x 82	4 x M20 x 35	F16 165	18	45	3 x 90	163
6x13	8100	129		158	166	40,9	563	735	72 x 115	8 x M16 x 50	F25 254	20	22,5	7 x 45	213
6x14	12000	170		175	175	47,9	580	754	85 x 117	8 x M20 x 37,5	F30 298	22	22,5	7 x 45	258
6x15	16700	245		175	175	55,4	580	754	98 x 132,5	8 x M20 x 57	F30 298	28	22,5	7 x 45	292

DIMENSIONS SINGLE ACTING ACTUATORS

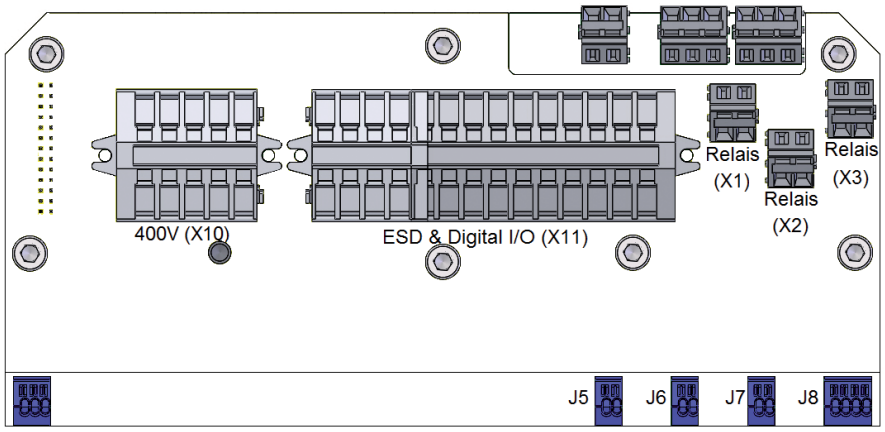
TriVAX® PLUS Helical 90°



Size	Max. spring ending torque	H1	H3	B1	B2	B3	L1	L2	Ø d1 x depth	Ø d2 x depth	Ø d3	4xB4	a	b	Weight
	[kN]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[°]	[°]	[kg]
6xx1	2200	19	1075	158	158	27,8	609	777	48 x 70	4 x M16 x 26	F14 140	14	45	3 x 90	353
6xx2	4000	58	1196	200	200	34,4	634	834	60 x 82	4 x M20 x 35	F16 165	18	45	3 x 90	535
6xx3	6000	178	1190	228	228	40,9	656	886	72 x 115	8 x M16 x 50	F25 254	20	22,5	7 x 45	700
6xx4	8300	178	1333	275	275	40,9	698	974	72 x 115	8 x M16 x 50	F25 254	20	22,5	7 x 45	1042
6xx5	12500	224	1421	285	285	47,9	707	992	85 x 117	8 x M20 x 52,5	F30 298	22	22,5	7 x 45	1230

TERMINAL BLOCK

TriVAX® PLUS Helical 90°



TERMINAL BLOCK		
OPERATING VOLTAGE – TERMINAL BLOCK X10		
L1-L2-L3 + ground wire + N		
ESD AND DIGITAL IN- / OUTPUTS – TERMINAL BLOCK X11		
ESD IN – Input 24 V DC	At low-signal ESD will be released	
Digital Inputs 1 – 4 Assignment depends on configuration	**Latched operation**	DI1: OPEN DI2: CLOSE DI3: STOP DI4: Configurable
	Push-to-run operation	DI1: OPEN DI2: CLOSE DI3: Configurable DI4: Configurable
	2-wire control	DI1: Control Input OPEN/CLOSE DI2: Configurable DI3: Configurable DI4: Configurable
Digital Outputs 1– 4 Assignment depends on configuration	**Default values**	DO1: Actuator moves DO2: Selector Switch LOCAL DO3: Inactive DO4: Inactive
VOLTFREE CONTACTS (OUTPUTS) TERMINAL BLOCKS X1 – X2 – X3		
Digital Outputs 5 – 7 Assignment depends on configuration	**Default values**	DO5: End position OP DO6: End position CL DO7: Monitor
ANALOGUE IN- / OUTPUTS – TERMINAL BLOCKS J5 – J6 – J7		
Analogue Inputs 1 – 2	AI1: Set point of actuator position (J6)	
	AI2: Set point of actuator speed (J7)	
Analogue Output 1	AO1: Retransmission of actual actuator position (J5)	
CABLE ENTRIES		
2x M25x1,5	1x M16x1,5	

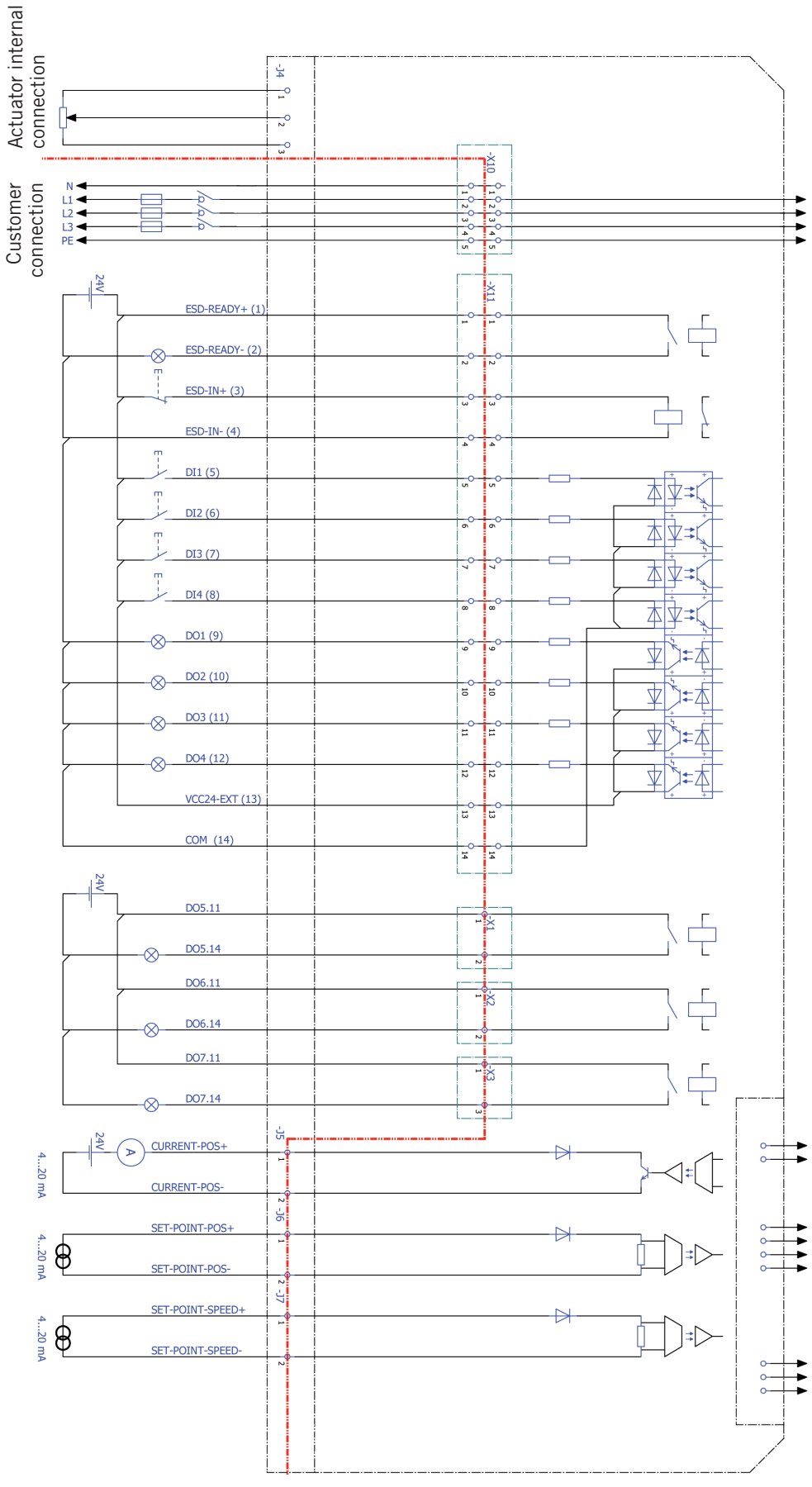
POSSIBLE CONFIGURATIONS TRIVAX INTERFACES AND DIAGNOSTICS

TriVAX® PLUS Helical 90°

CONFIGURATIONS	
DIGITAL INPUTS 1 – 4	
Block LOCAL operation	Configurable as active HIGH or as active LOW Input
Start partial stroke test	
Error ack	
Interlock REMOTE	
DIGITAL OUTPUTS 1 – 7	
Calibration complete	Configurable as active HIGH or as active LOW Output
LOCAL blocking active	
Position OPEN	
Position CLOSED	
Actuator moves	
Failure	
Selector LOCAL	
Selector REMOTE	
Selector NULL	
Maintenance required	
Out of specification	
Functional check	
Collective Failure (Monitor)	
Partial Stroke Test not OK	
Partial Stroke Test active	
Partial Stroke Test OK	
Actuator ready	
ANALOGUE INPUT (FOR TRIVAX 6200 AND 6300 ONLY)	
Threshold control	
Positioner	For TriVAX 6300 ONLY
PARTIAL STROKE TEST (FOR TRIVAX 6200 AND 6300 ONLY)	
PST Direction	OPEN or CLOSE
PST Angle	3 – 99 %
PST Reference value	Ref.characteristic/max. limit
PST tolerance	0 – 100 %
PST Activation	Control room/time interval 1 – 999 days

WIRING PROPOSAL

TriVAX® PLUS Helical 90°



ORDERING CODE

TriVAX® PLUS Helical 90°

CODE	DESCRIPTION	COMMENT
TRIVAX		
TX		
ACTUATOR		
4	TriVAX Linear	
5	TriVAX Quarter turn	Scotch Yoke
6	TriVAX Quarter turn	Helical
FUNCTION		
1	Simple On/Off	
2	Smart On/Off	
3	Smart Positioning	
SAFETY FUNCTION		
1	FS Hold (DA)	Linear: CL = Piston extended Quarter turn: Clockwise to close
4	FS Mechanic OP	
5	FS Mechanic CL	
6	FS Hold (DA) invers	Linear: CL = Piston retracted Quarter turn: Counter-clockwise to close
9	FS Mechanic OP invers	
0	FS Mechanic CL invers	
A	Without (DA)	ESD disabled – Closing direction see above
B	Without (DA) invers	
OPERATING TORQUE / SIZE		
1	DA: 2 kNm / FS Mech: 2,2 kNm	
2	DA: 4 kNm / FS Mech: 4 kNm	
3	DA: 8,1 kNm / FS Mech: 6 kNm	
4	DA: 12 kNm / FS Mech: 8,3 kNm	
5	DA: 16,7 kNm / FS Mech: 12,5 kNm	
STROKE		
–	Quarter turn actuator 90°	
A	50 mm	
B	75 mm	
C	100 mm	
D	150 mm	
E	220 mm	
VOLTAGE		
1	3 ph / 400V / 50 Hz	
2	1 ph / 230V / 50 Hz	
3	3 ph / 480 V / 60 Hz	

ORDERING CODE

TriVAX® PLUS Helical 90°

CODE	DESCRIPTION	COMMENT
PROTECTION CLASS / APPROVAL		
A	SIL / IP65	
B	SIL / ATEX	
M	IP65	
N	ATEX	
E	SIL / cCSAus – Ordinary Location	
F	SIL / cCSAus – Hazardous Location	
G	SIL / IECEx	
Q	cCSAus – Ordinary Location	
R	cCSAus – Hazardous Location	
S	IECEx	
TEMPERATURE RANGE		
1	Standard	–25°...+70 °C
3	Low temperature	–30°...+60 °C
FIELDBUS		
0	Without	
3	HART	
MOUNTING ORIENTATION		
0	Standard	Vertical – display above
1	Upside down	Vertical – display below
2	righthand 0°	Choose everytime „0“ for actuators which does’t need a fixed mounting position FS Hold (DA) / FS Mech
3	righthand 90°	
4	righthand 180°	
5	righthand 270°	
6	lefthand 0°	
7	lefthand 90°	
8	lefthand 180°	
9	lefthand 270°	
OPTIONAL FEATURES		
0	Without	
1	Hand pump small	4 cm³/stroke
2	Hand pump large	12 cm³/stroke – actuator size 3 and larger
ELECTRIC / MECHANIC CONNECTION		
1	Cable entry metric / mech. connection standard (see dimensional drawing)	
5	Cable entry NPT (with adaptors) / mech. connection standard (see dimensional drawing)	
CORROSION PROTECTION		
1	Standard	Acc. ISO 12944-2 C3
2	Off-shore	Acc. ISO 12944-2 C5M
3	Primer only	

NOTES

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HOERBIGER AUTOMATISIERUNGSTECHNIK GmbH
Südliche Römerstraße 15
86972 Altenstadt, Germany
Tel. +49 (0)8861 221-0
Fax +49 (0)8861 221-1305
E-Mail: info@hoerbiger.com
www.hoerbiger.com

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