Operating and Installation Instructions

Thrust actuator

ARI-PREMIO®-Plus 2G

Contents

0040501006 1620 english (englisch) ***- Translated original instructions -***

1.0 General information on operating instructions

These operating instructions provide information on mounting, handling and maintaining the thrust actuators. Please contact the supplier or the manufacturer in case of problems which cannot be solved by reference to the operating instructions.

They are binding on the transport, storage, installation, start-up, operation, maintenance and repair.

The notes and warnings must be observed and adhered to.

- Handling and all work must be carried out by expert personnel or all activities must be supervised and checked.

It is the owner's responsibility to define areas of responsibility and competence and to monitor the personnel.

- In addition, current regional safety requirements must be applied and observed when taking the fittings out of service as well as when maintaining and repairing them.

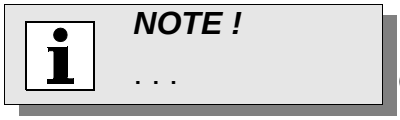
The manufacturer reserves the right to introduce technical modifications at any time.
These Operating Instructions comply with the requirements of EU Directives.

2.0 Notes on possible dangers

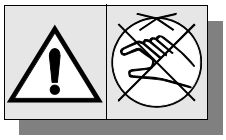
2.1 Significance of symbols

Warning of general danger.

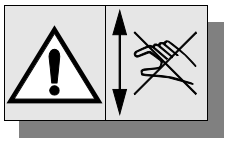
Warning of dangerous voltage.



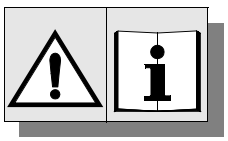
General information.



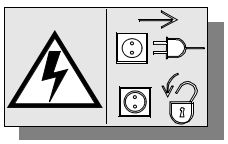
Exposed to injury!
Don't touch the turning handwheel when the motor is running.



Exposed to injury!
Don't put your hand into the up or downloads moving appliance.



Danger when not observing the operating and installation instructions!
Before installing, operating, maintenance or dismantling read and observe the instructions.



Danger though voltage!
Before dismantling the hood, switch of the electrical source and secure against turning on again.

2.2 Explanatory notes on safety information

In these Operating and Installation Instructions dangers, risks and items of safety information are highlighted to attract special attention.

Information marked with the above symbol and "***ATTENTION !*** " describe practices, a failure to comply with which can result in serious injury or danger of death for users or third parties or in material damage to the system or the environment. It is vital to comply with these practices and to monitor compliance.

All other information not specifically emphasised such as transport, installation, operating and maintenance instructions as well as technical data (in the operating instructions, product documentation and on the device itself) must also be complied with to the fullest extent in order to avoid faults which in turn can cause serious injury to persons or damage to property.

3.0 Storage and transport

ATTENTION !

- Valve mountings such as drives, handwheels, hoods must not be used to take external forces, e.g. they are not designed for use as climbing aids, or as connecting points for lifting gear.
Non-compliance may lead to death, injury or damage to property due to persons falling or parts being dropped.

- Suitable materials handling and lifting equipment should be used.
See „4.4 Technical data".

- At -40 °C to +85 °C dry, free from dirt.
- Do not unpack thrust drive or setting equipment assembly prior to installation.
- Protect against external force (impact, vibration etc.).
- Do not soil or damage type identification plate and wiring diagram on the controller.

4.0 Description

4.1 Field of application

ARI-PREMIO®-Plus 2G linear thrust actuators are employed to actuate control or shut-off valves requiring a nominal linear stroke distance.

The intelligent ARI-PREMIO®-Plus 2G thrust actuator is used whenever the actuator is controlled with an analogue signal (0 to 10 V/4 to 20 mA) or a 3-point signal and feedback information about positions, operating states, faults, etc. has to be output.

If supplied with the valve, the lift of the thrust actuator will be set to the stroke distance of the valve. Selection of the proper actuator version in alignment with the corresponding fitting as well as use of the thrust actuator in accordance with the specified technical data is the responsibility of the systems engineer.
See data sheet for areas of application, application limits and potential.
Any use of the thrust actuator beyond the specified technical data or improper use of the actuator is deemed to be not for the intended purpose.

The ambient conditions have to be conform to the actual electromagnetic compatibility directives. Additional the compatibility to this directives has to be maintained in case of expansion or other changing of the ambient conditions.

4.2 Method of functioning

The eight parameter switches allow the ARI-PREMIO®-Plus 2G thrust actuator to be adapted to a variety of situations without a PC or tools. The electronics are likewise suitable for use in a wide range of supply and signalling systems.

The motor and spindle can be moved up and down in manual mode by means of the ▲ and ▼ switch positions.

The valve final positions and the type of control (3-point or analogue) are automatically determined by the electronics in an initialization run. An analogue signal must be present at the input during the initialization run for analogue control.

The desired position can be specified by means of the analogue control input. The input is protected against polarity reversal. It can be configured as a current (4 to 20 mA) or voltage (0 to 10 V) input using a switch.

Two binary control inputs are provided for the 3-point signal. These inputs are designed for a wide operating range with voltages from 12 V AC/DC to 250 V AC/DC.

The 3-point control signal takes priority over the analogue input signal, e.g. for fail-safe or anti-freeze protection. If a signal is present at both inputs (double control), the control mode is interrupted.

The spindle position is determined by means of non-contacting and non-wearing reflex sensors.

From software version 3.x.x upwards the ARI-PREMIO®-Plus 2G is driven by a brushless DC motor (BLDC). Its speed and position are controlled by the electronics with Hall sensors to protect the gearbox by facilitating soft starting as well as braking ahead of the desired position. The speed and positioning time can be varied with a 4-step slide switch

The electronic detects a wire break in the 4-20 mA control signal. The fail-safe behaviour in case of a control signal failure can be set with a 3-step slide switch.

The actual position (position feedback) is output via the analogue output (optional). The output signal is configured as a current or voltage output using the same switch as for the analogue input signal. The output is electrically isolated.

Four unassigned relay outputs can be optionally supplied for alarm signals and connection to 24 V to 250 V DC/AC voltage. By using gold-plated contacts, it is possible to switch both binary inputs with a low operational current and switching currents up to 2 A. With 250 V AC operation, the gold plating can be burned off once without any negative effects on this connection type.

4.3 Diagram

4.3.1 ARI-PREMIO®-Plus 2G 2,2 - 5 kN

Yoke Version **Column Version**

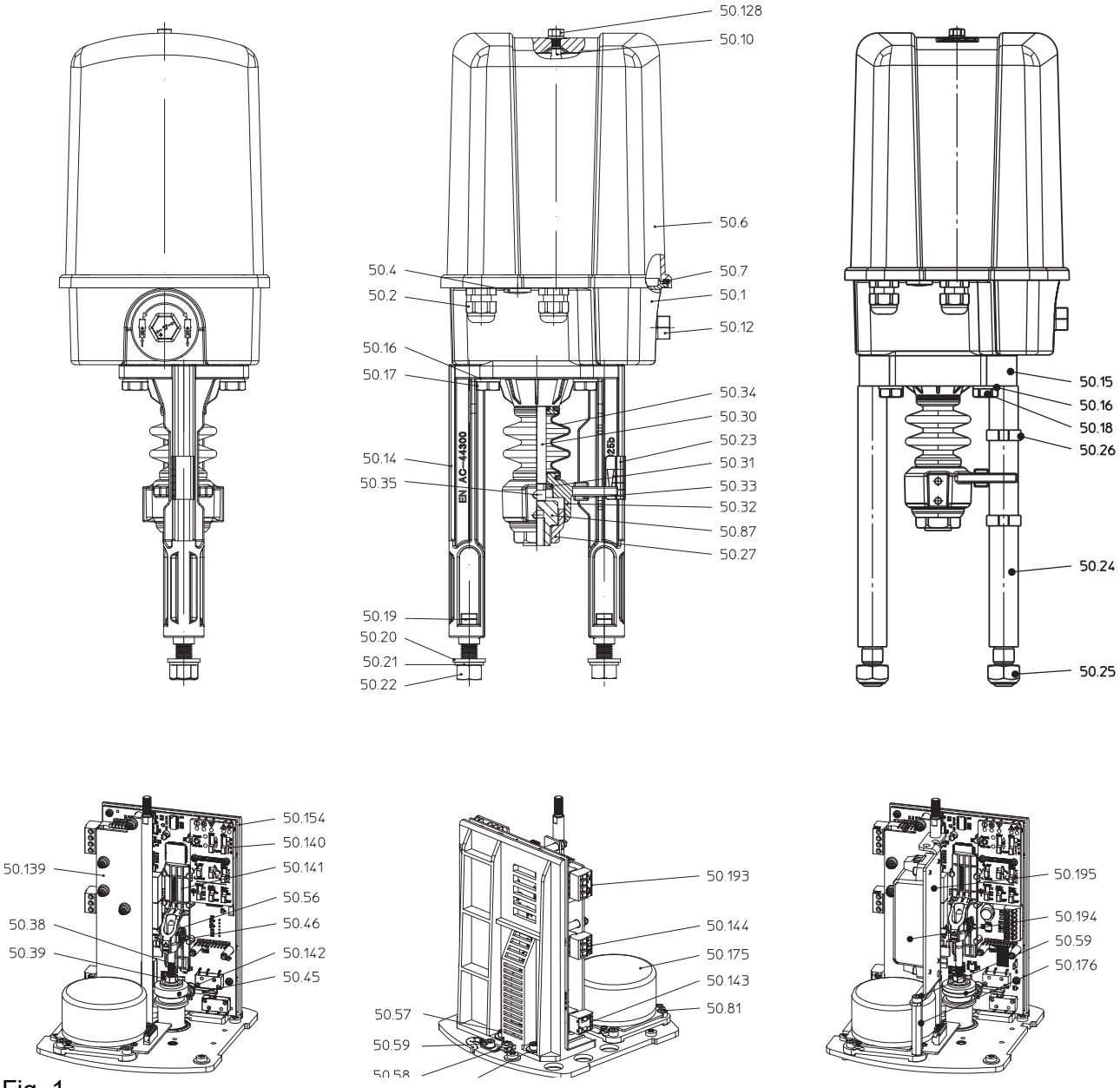


Fig. 1

4.3.2 ARI-PREMIO®-Plus 2G 12 - 25 kN

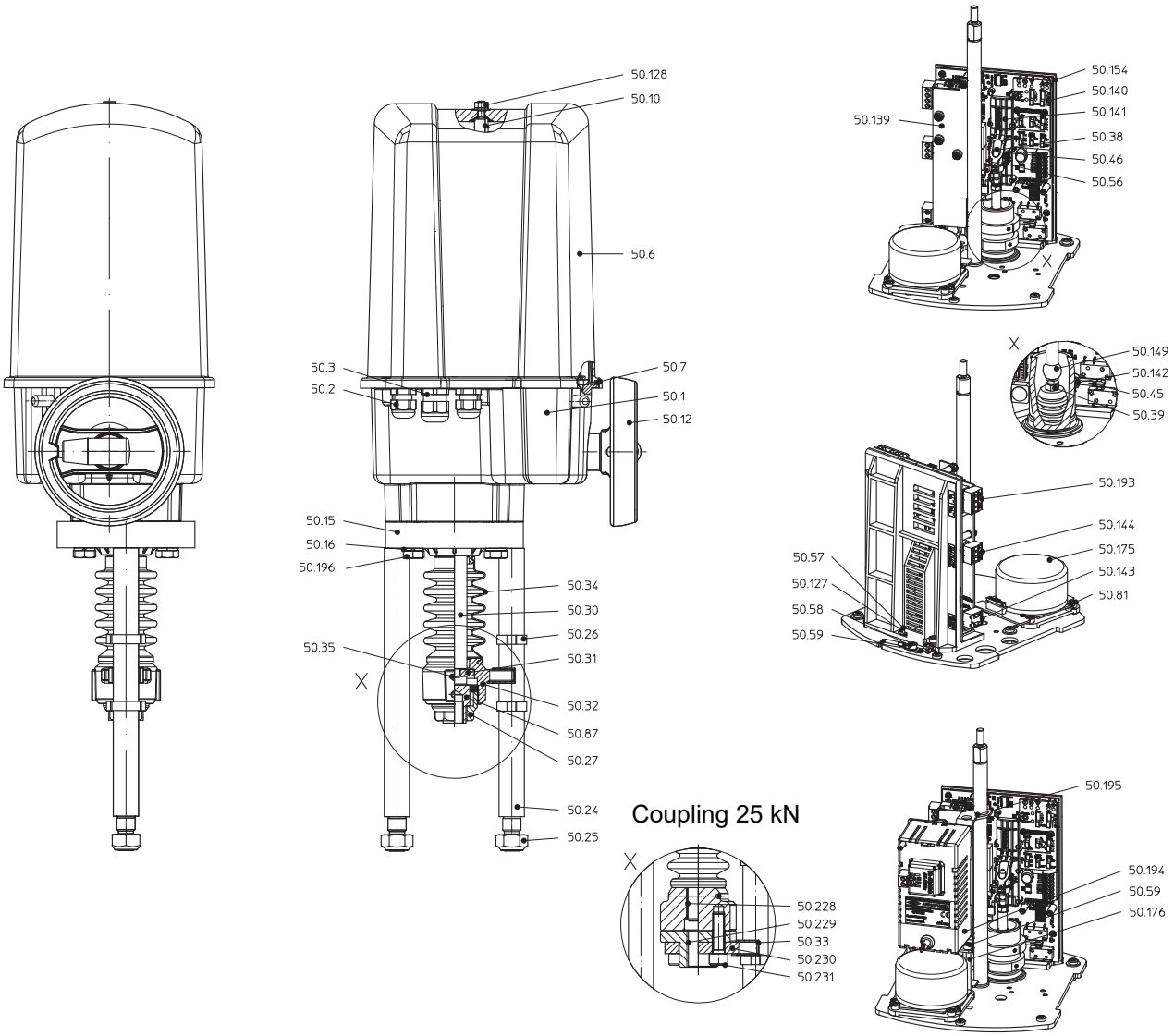


Fig. 2

4.3.3 Parts list

Pos.	Designation	Pos.	Designation
50.1	Gearbox	50.59	Cylinder screw DIN EN ISO 4762 - M4 x 6
50.2 / 50.3	Cable gland 2 x M16 x 1,5/ 1 x M20 x 1,5	50.81	Cylinder screw DIN EN ISO 4762 - M4 x 8
50.6	Hood	50.87	Threaded bush
50.7	Hood seal	50.127	Washer ISO 7093-1
50.10	Column	50.128	Collar nut with sealing ring M6
50.12	Handwheel	50.139	Protective cover
50.15	Flange	50.140	Switch cover
50.16	Spring washer DIN 128-A10	50.141	Trip slide
50.24	Distance column	50.142	Shakeproof washer
50.25	Hexagon nut DIN EN ISO 7042 - M16	50.143	Connector, 2-pole (N/L)
50.26	2-ear clamp (stroke indicator)	50.144	Connector, 3-pole (L↓/L↑/0 V)
50.27	Coupling	50.149	Axial joint
50.30	Driving spindle	50.154	Board support cpl. (incl. electronic)
50.31	Spindle safety feature	50.175	BLDC motor
50.32	Torsion safety feature	50.176	Distance bolt M4x40
50.34	Bellow	50.193	Connector, 4-pole (Y_{in} / Y_{out})
50.35	Grub screw DIN ISO 4766 - M6	50.194	Power supply, cpl.
50.38	Guide spindle	50.195	Fixing bracket for power supply
50.39	Hexagon nut DIN EN 24034 - M5	50.196	Hexagon bolt DIN EN 24017 - M10 x 100
50.45	Shift lever	50.228	Spindle unit PREMIO 25 kN
50.46	Spring washer	50.229	Threaded bush PREMIO
50.57	Cylinder screw DIN EN ISO 4762 - M4 x 10	50.230	Securing flange
50.58	Protective conductor terminal	50.231	Cylinder screw DIN EN ISO 4762 - M10 x 35

4.4 Technical data

Type		ARI-PREMIO®-Plus 2G				
Thrust force	kN	2,2	5,0	12,0	15,0	25,0
Operating speed	mm/sec.	0,25/0,38/0,47/1,0 adjustable		0,20/0,31/0,38/0,79 adjustable		
Travel distance max.	mm	50		80		
Duty classification acc. to EN 60034-1		S3 - 80 % CDF/max. 1200 c/h (at +70 °C)				
Supply voltage	V	24 V AC/DC				
Motor type		BLDC (Brushless DC motor)				
Power consumption	VA	max. 65				max. 130
		(depends on the operating speed)				
Torque switch		2 pcs. included internally				
Enclosure EN 60529		IP 65				
Max. storage temperature		-40 °C ... +85 °C				
Max. permissible ambient temperature		-20 °C ... +70 °C, , for UL/CSA version up to max. +60 °C				
		(For outdoor use and sub-zero temperatures, a heating is recommended!)				
Hand operating device		Yes (always running)		Yes (engageable)		
Operation		optional:· 3-point: 12 V AC/DC to 250 V AC/DC· 0 to 10 V DC load resistance 500 kOhm resolution 12 Bit· 4 to 20 mA DC load resistance 125 Ohm resolution 12 Bit				
Max. cable cross section		Supply voltage: 2,5 mm² 3 point input: 2,5 mm² Control signals: 2,5 mm²				
Mounting position		Any. Exception: motor not hanging downwards				
Cable diameter for cable glands		2 x M16 x 1,5: 5 - 9,5 mm		2 x M16 x 1,5: 5 - 9,5 mm 1 x M20 x 1,5: 8 - 13 mm		
Electrical safety according to DIN EN 61010, part 1		Overvoltage category II Pollution degree 2 Altitude up to 2000 m Rel. humidity ≤ 90 % non-condensing				
Characteristics at control signal failure		adjustable with slide switch: AUF, STOP, ZU				
Gear lubricant		Klüber Isoflex Topas NB152		Klübersynth G32-130		
Weight	kg	5,4		9,5		11

Accessories	see page 11

Additional voltage

Switching power supply for ARI-PREMIO®-Plus 2G		2,2 - 5 kN	12 - 15 kN	25 kN
Voltage	V - Hz	100 - 240 V AC 50/60 Hz		
Power consumption	VA	max. 31,2	max. 60	max. 130

Transformer for ARI-PREMIO®-Plus 2G		2,2 - 5 kN	12 - 15 kN	25 kN
Voltage	V - Hz	3~ 400 V 50/60 Hz		
Power consumption	VA	max. 65		max. 119

100 - 240 V AC			3~ 400 V
2,2 - 5 kN	**12 - 15 kN**	**25 kN**	**2,2 - 25 kN**
			

Accessories

Type		ARI-PREMIO®-Plus 2G 2,2 - 25 kN
Binary Feedback	Type Relay card	• 2 intermediate positions, - to set by switch, - changeover contacts 250 V AC 3 A ohm resistive load, 6 A inductive load • 1 failure signal and 1 warning signal, - changeover contacts 30 V AC/DC/2 A
Electronic position indicator	Type Analogue output card	• analogue output for position feedback • 4 - 20 mA switchable to 0 -10 V • invertable • galvanic isolation between the mains voltage and feedback signal • active
Heating	Heating resistor	• 230 V AC, 115 V AC, 24 V AC/DC; 15 W • automatic switching circuit
Potentiometer	Conductive (max. 2 pcs.)	• 1000, 2000, 5000 Ohm; 1 Watt (at +70 °C) • Wiper current max. 0,01 mA/recommended 0,002 mA
	Wire (max. 2 pcs.)	• 100, 200 Ohm; 0,5 Watt (at +70 °C) • Wiper current max. 35 mA/recommended 0,02 mA
LED-Status indicator	2,2/5 kN 12/15/25 kN	• From the outside and all sides of the actuator visible status indication; • green = OK.; red = Error; yellow = Warning; blue = Maintenance; • Intermediate upgrade module starting from SW version 3.3.X
Communications package	2,2/5 kN 12/15/25 kN	• Features: - Bluetooth interface for communication with PREMIO-Plus App - Electronic positioner: 4 - 20 mA switchable to 0 - 10V - LED-Status indicator
Process-(controller)	Type Processcontroller dTRON 316	• Mounted in the actuator • 4-20 mA output for operation of ARI-PREMIO®-Plus 2G • for resistance thermometers and thermocouples (provided by the customer) or standard signals, • Pre-configured for temperature control: control range from -200 °C up to +850 °C (resistance thermometer)
Bus systems	PROFIBUS-DP Anybus® Communication interface Modbus RTU Anybus® Communication interface	Control command: • 3 point: OPEN, Stop, Close • Nominal position value 0 - 100 • Reset-initialization Feedback signals: • Actual position value 0 - 100 • Failures, warning messages, end position switches, etc.

4.5 Interface description

4.5.1 Control - Run commands

Control	Description - Technical data	Required options
OPEN-STOP-CLOSE (3-point)	**2 Binary input** - 12 V AC/DC to 250 V AC/DC	-
	Modbus-RTU - Protocol: Modbus, Modbus-integer - Baud rate: 4200 ... 115200 (default) - Device address: 1 ... 247 - Max. number of participants: 247	***- Anybus-Interface***
	Profibus-DP - Device address: 0 ... 125	- ***dTRON316*** with Profibus card (dTRON options)
Set point control for position controller	**4 - 20 mA DC** - Burden 125 Ohm - Resolution: Dead band ±0,5 % - Electrically isolated	- Optional ±0,25 %
	0 - 10 V DC - Burden 500 kOhm - Resolution: Dead band ±0,5 % - Electrically isolated	-
	Modbus-RTU - Protocol: Modbus, Modbus-integer - Baud rate: 9600, 19200, 38400 - Device address: 0 ... 255 - Max. number of participants: 32	***- Anybus-Interface***
	Profibus-DP - Device address: 0 ... 125	***- Anybus-Interface***
Set point control for PID-Process controller (Option dTRON 316)	**4 - 20 mA DC** - Burden 75 Ohm - Resolution 10 Bit	- ***dTRON316*** with analogue output card and analogue input card (dTRON options)
	0-10V DC - Burden > 100 kOhm - Resolution 10 Bit	- ***dTRON316*** with analogue output card and analogue input card (dTRON options)

4.5.2 Feedback

	Description	Required option
Position (analogue)	**4 - 20 mA DC** - Measuring resistance (Burden) max. 500 Ohm	**- Analogue output card ARI-PREMIO®-Plus 2G**
	0 - 10 V DC - Measuring resistance (Burden) max. 2 kOhm Burden	**- Analogue output card ARI-PREMIO®-Plus 2G**
	Modbus-RTU - Protocol: Modbus, Modbus-integer - Baud rate: 9600, 19200, 38400 - Device address: 0 ... 255 - Max. number of participants: 32	***- Anybus-Interface***
	Profibus-DP - Device address: 0 ... 125	***- Anybus-Interface***
Position 2x - Intermediate positions - End positions	**Change over contact 250 V AC 6/3 A**	**- Relay card ARI-PREMIO®-Plus 2G**
	Modbus-RTU - Protocol: Modbus, Modbus-integer - Baud rate: 9600, 19200, 38400 - Device address: 0 ... 255 - Max. number of participants: 32	***- Anybus-Interface***
	Profibus-DP - Device address: 0 ... 125	***- Anybus-Interface***
Failure signal - Control signal failure - Position can not be achieved (motor / gear failure) - Blockage (current) - Actuator is not initialized - Power failure	**Change over contact 30 V AC/DC 2 A**	**- Relay card ARI-PREMIO®-Plus 2G**
	Modbus-RTU - Protocol: Modbus, Modbus-integer - Baud rate: 9600, 19200, 38400 - Device address: 0 ... 255 - Max. number of participants: 32	***- Anybus-Interface***
	Profibus-DP - Device address: 0 ... 125	***- Anybus-Interface***
Warning signal - Manual operating device - Blockage (detected) - Position cannot be achieved - Maintenance - Inside temperature exceeded - CDF-Management active - Levelling - Too small travel during initialization	**Change over contact 30 V AC/DC 2 A**	**- Relay card ARI-PREMIO®-Plus 2G**
	Modbus-RTU - Protocol: Modbus, Modbus-integer - Baud rate: 9600, 19200, 38400 - Device address: 0 ... 255 - Max. number of participants: 32	***- Anybus-Interface***
	Profibus-DP - Device address: 0 ... 125	***- Anybus-Interface***

4.5.3 Design notes

4.5.3.1 Control signal

- At the 4 - 20 mA signal, from a control signal < 3.6 mA, control signal failure will be detected.
- A cable break is detected in both the current signal 4 - 20 mA as well as the voltage signal 2 - 10 V.
- The control signal range is fixed from 0 - 10 V, resp. 4 - 20 mA. From software version 3.x.x upwards it is possible to set alternatively the voltage signal for auf 2 - 10 V via the diagnostics interface and PC. The 2 - 10V then apply also for the feedback signal. A diagnostics connector and instructions can be ordered on request.
- The 3 point control signal has a higher priority than the analogue control signal. This can for example be used for frost protection or a local control.
  In a concurrent control in direction OPEN and CLOSED, over the 3-point control signal, the motor stops, so that the drive no longer follows the analogue input signal.
- The switch positions for control signal type and inversion affects to the analogue input and feedback signal. There are no separate settings for the input and feedback signal possible.

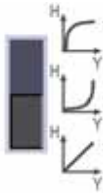
4.5.3.2 Behavior in control signal failure / error

- The fail-safe behaviour in case of a control signal failure or a cable break can be set for the analogue control signal with a 3-step slide switch: OPEN – STOP – CLOSED.
- Alternatively, any position between 0 - 100 % can be submitted via the diagnostics interface and PC. At 101 %, the actuator rests at his most recent position.

ATTENTION !

In the same way as in the older software versions (at values between 0-101%), the slide switch sets three different actuator characteristics that define the relationship between the input signal and the valve position. For a linear relationship please set this switch to the lowest position.

In order to specify the fail-safe position using the switches again, you must enter in the software a value of 102 % for this position.



"Inverse equal-percentage"

"Equal-percentage"

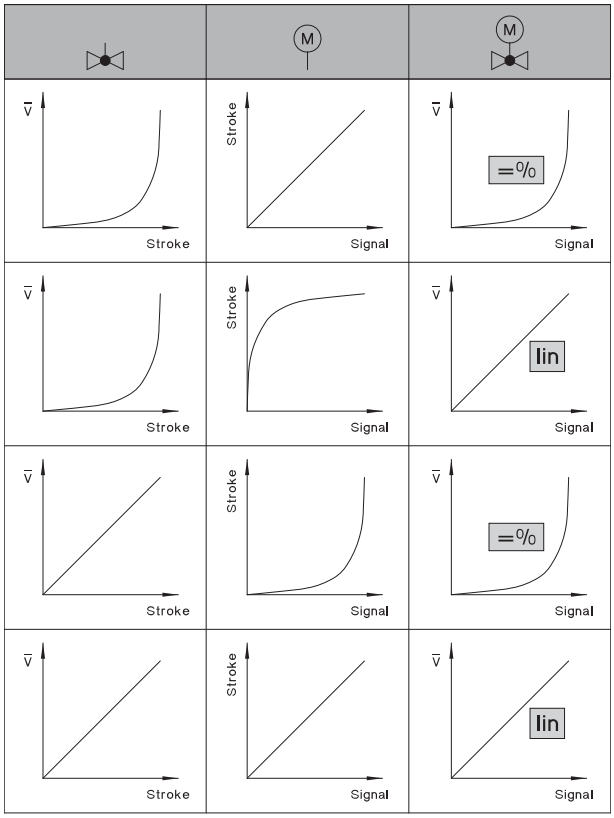
"Linear"

The characteristic correction function allows you to adjust the effective characteristic of the actuator as shown in the graphs opposite.

> ***NOTE !***
>
> *Note the minimum increments/ pulses of the motor/actuator (approx. 0.25 s)!*
>
> *The resolution is therefore limited, particularly with the equalpercentage and inverse equalpercentage actuator characteristics.*
>
> *The most suitable valve characteristic should ideally be selected with a linear actuator characteristic.*

Fig. 3

Valve characteristic + actuator characteristic = effective characteristic



4.5.3.3 Analogue feedback signal

For execution control in the Control/PLC following items have to be considered:

- If the actuator is not initialized, 0 V or 0 mA is published.
- When **ANTI-Block ON**, the actuator automatically tries to remove a blockage. For this, the plug is lifted up to 4 times with increasing travel. The lifting of the valve plug can also be seen on the feedback signal.
- In the end position for the **tight sealing function** (inhibition of force) a "capture range" is defined. If the analogue input signal get into this range, the actuator drives up to the limit switch. Here the difference between input and output signal can be larger than in the normal control range. The deviation is from the actuator and valve travel dependent.
- By **CDF management**, the duty cycle of the motor is reduced to prevent an overheating. This allows the differences between the control signal and feedback will be greater

4.5.3.4 dTRON 316

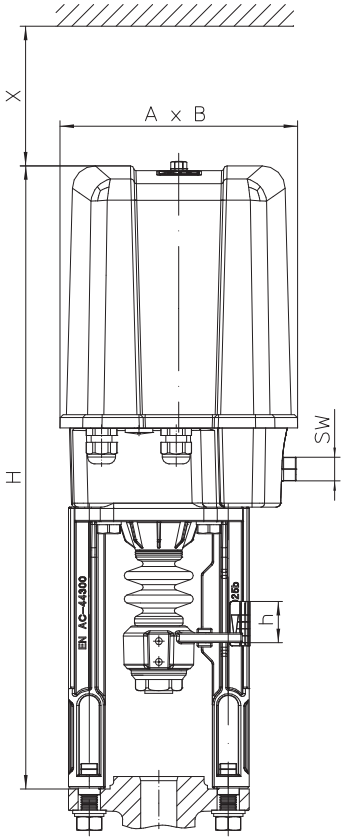
- Standard inputs and outputs dTRON 316:

  - 1 Analogue input for sensor or standardised control signal
  - 2 Binary inputs
  - 2 Binary outputs: Relay shutter 230 V/3 A

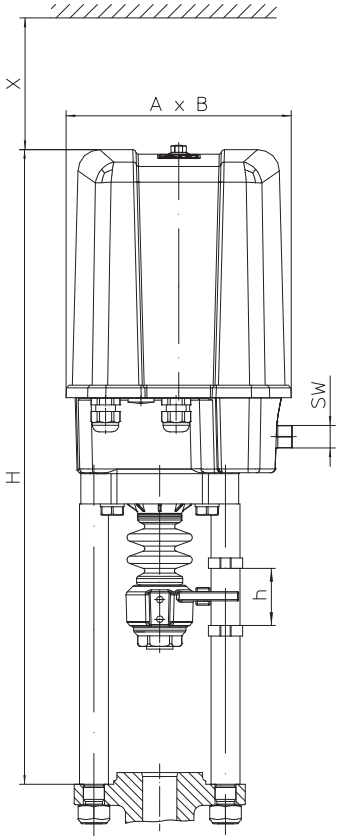
- A **maximum of 2 optional cards** for the dTRON 316 are possible:

  - Analogue input card with 1 additional analog input
  - Analogue output card with 1 additional analogue output
  - Solid state relay card with 1 solid state relay 230 V/1 A
  - Binary input card for 2 additional binary inputs
  - RS422/485 card for Modbus
  - Profibus car for Profibus-DP
  - Relay card with a change over contact (only on option slot 1 possible)
  - Relay card with 2 shutter (only on option slot 1 possible)

4.6 Dimensions

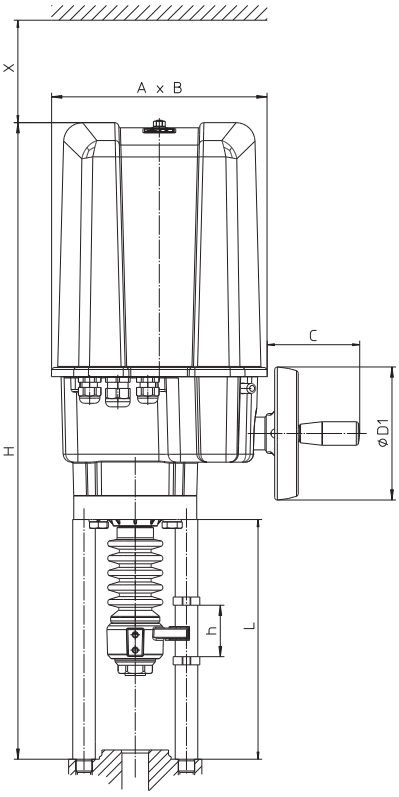


2,2 - 5 kN
Nominal stroke max. 30 mm



2,2 - 5 kN
Nominal stroke > 30 mm - 50 mm

		2,2 - 5 kN	
A	(mm)	171	
B	(mm)	156	
SW	(mm)	17	
X	(mm)	150	
H	(mm)	448	482
h (Nominal stroke)	(mm)	max. 30	max. 50



12 - 25 kN

		12 - 25 kN		
A	(mm)	210		
B	(mm)	184		
C	(mm)	90		
ØD1	(mm)	130		
X	(mm)	200		
H	(mm)	622	637	652
h (Nominal stroke)	(mm)	max. 50	max. 65	max. 80
L (Column)	(mm)	234	249	264

Fig. 4

5.0 Installation

ATTENTION !

- Work on electrical systems or equipment must only be carried out by qualified electricians or by trained individuals under the guidance and supervision of a qualified electrician in compliance with regional electrical safety requirements and regulations.

- When connecting the thrust actuator the supply line must be disconnected from the mains (not live) during connection work. It must be impossible to switch the power on unintentionally while the mains are disconnected in this way. Failure to comply may result in death, serious injury or substantial damage to property.

- Valve mountings such as drives, handwheels, hoods must not be used to take external forces, e.g. they are not designed for use as climbing aids, or as connecting points for lifting gear.
Non-compliance may lead to death, injury or damage to property due to persons falling or parts being dropped.

- Actuator components which rotate or move during operation are coloured red. Crushing and injury hazard!

5.1 General installation data

Apart from installation errors, incorrectly set values on the controller or the thrust actuator (setpoint, parameter level data, internal modifications) can prevent the downstream process from functioning correctly – or in the worst case result in damage. Safety devices that are independent of the controller and the actuator, e.g. pressure relief valves or temperature limiters / sensors should always be fitted for this reason, and they should only be adjusted by suitably qualified persons. Please also comply with the relevant safety regulations.

In addition to general installation guidelines, the following points are required to be observed:

Planners / construction firms and operators are responsible for positioning and installing the products.

- Conformity of technical data on thrust actuator with field conditions.
- Ease of access to installation site.
- Adequate clearance space above the thrust actuator for removing the hood (refer to point 4.6 Dimensions).
- Install where there is protection against high-energy heat radiation.
- Thrust actuator mountable in any position except in downward suspended position.
  If installed with a horizontal connecting rod, the thrust actuator must be mounted so both yoke legs or columns are on top of one another in the vertical plane (see Fig. 5).

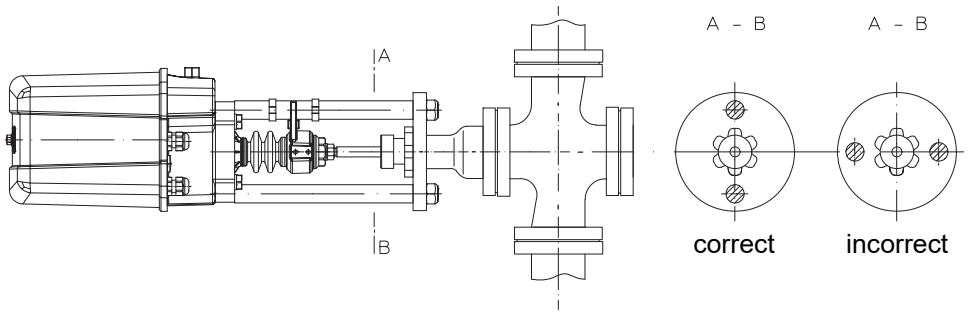


Fig. 5

If installed outdoors, the thrust actuator must be provided with an additional cover to protect against:

- · rain
- · direct insulation
- · dust.

Check thrust actuator for damage prior to fitting. Damaged parts must be replaced by original spares.

The following must be provided:

- Complete valve with crossbar and Operating Instructions. The valve plug must be approximately in the mid-lift position – never in contact with a seat!
- Thrust actuator complete with yoke or distance columns and coupling parts intended for mounting to the corresponding valve.
- In case of widely fluctuating ambient temperatures, high atmospheric humidity and temperatures below the freezing point, your are recommended to install a heating resistor to minimise condensation buildup in the actuator.

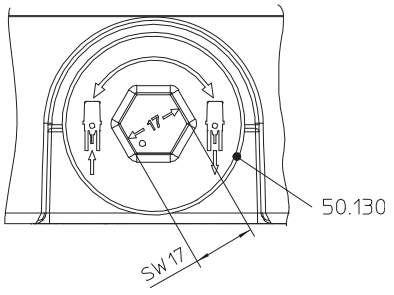
5.2 Manual operation

ATTENTION !

- The manual operating device always rotates during motor-driven operation (running indicator). Never activate the manual operating device while the motor is running. Injury hazard!

- In the manual operating mode pay careful attention in the final positions that the manual operating device is only turned to the point where the torque switch trips (audible click) as otherwise damage will be caused to the thrust actuator!

5.2.1 ARI-PREMIO®-Plus 2G 2,2 - 5 kN



max. rpm !
n = 300 U/
min

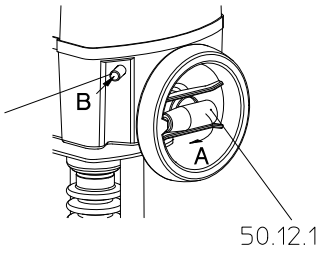
Fig. 6

5.2.2 ARI-PREMIO®-Plus 2G 12 - 25 kN

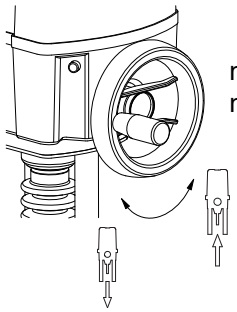
The motor is no longer in mesh when the handwheel is engaged and the button must remain pressed.

ATTENTION !

The handwheel is back disengaged by releasing the button.



Engaging button
for manual mode



max. rpm !
n = 300 U/min

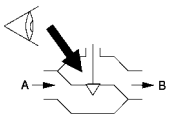
Fig. 7

5.3 Mounting to valves

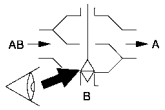
A Mount adapter parts

Setting dimension (Y) and fitting-projection (X) are measured with inserted valve spindle!

2-way:



3-way:



ATTENTION !

connecting thread up to M16:

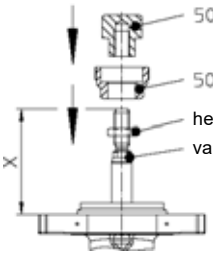
X = 60/83 mm → Y = 102 mm (+2 mm)
X = 98 mm → Y = 116 mm (+2 mm)

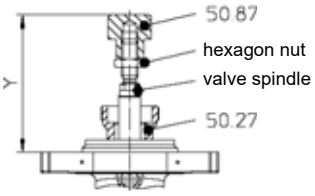
with adapter from M20 to M16:

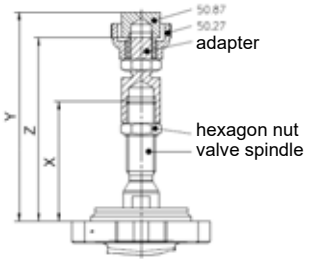
X = 60/83 mm → Z = 128 mm → Y = 146mm
X = 98 mm → z = 143 mm → Y = 161mm

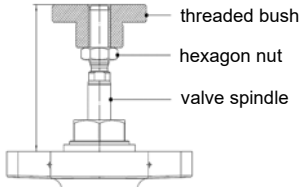
threaded bush 25kN:

X = 83/98 mm → Y = 98 mm



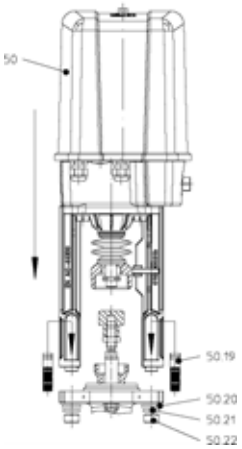




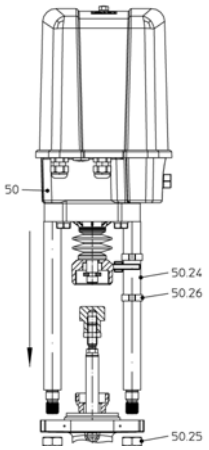


B Place actuator onto valve

a Yoke version

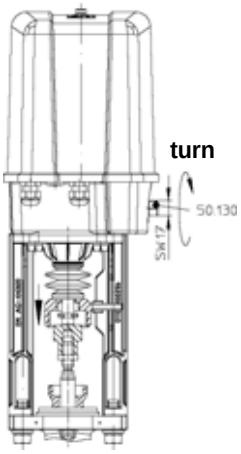


b Column version

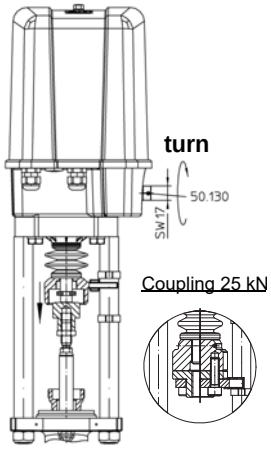


C Drive actuator spindle onto valve spindle

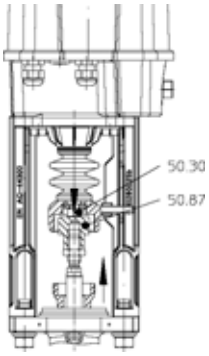
a 2,2 - 5 kN



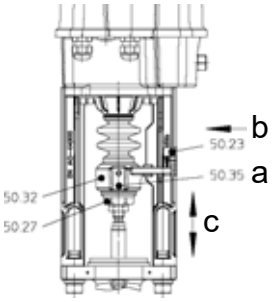
b 12 - 15 kN



D Screw the coupling



E Secure coupling in place with grub screw (a), clip lift dial (b) and position it (c)



5.4 Electrical connection

5.4.1 Wiring diagram ARI-PREMIO®-Plus 2G 2,2 - 25 kN

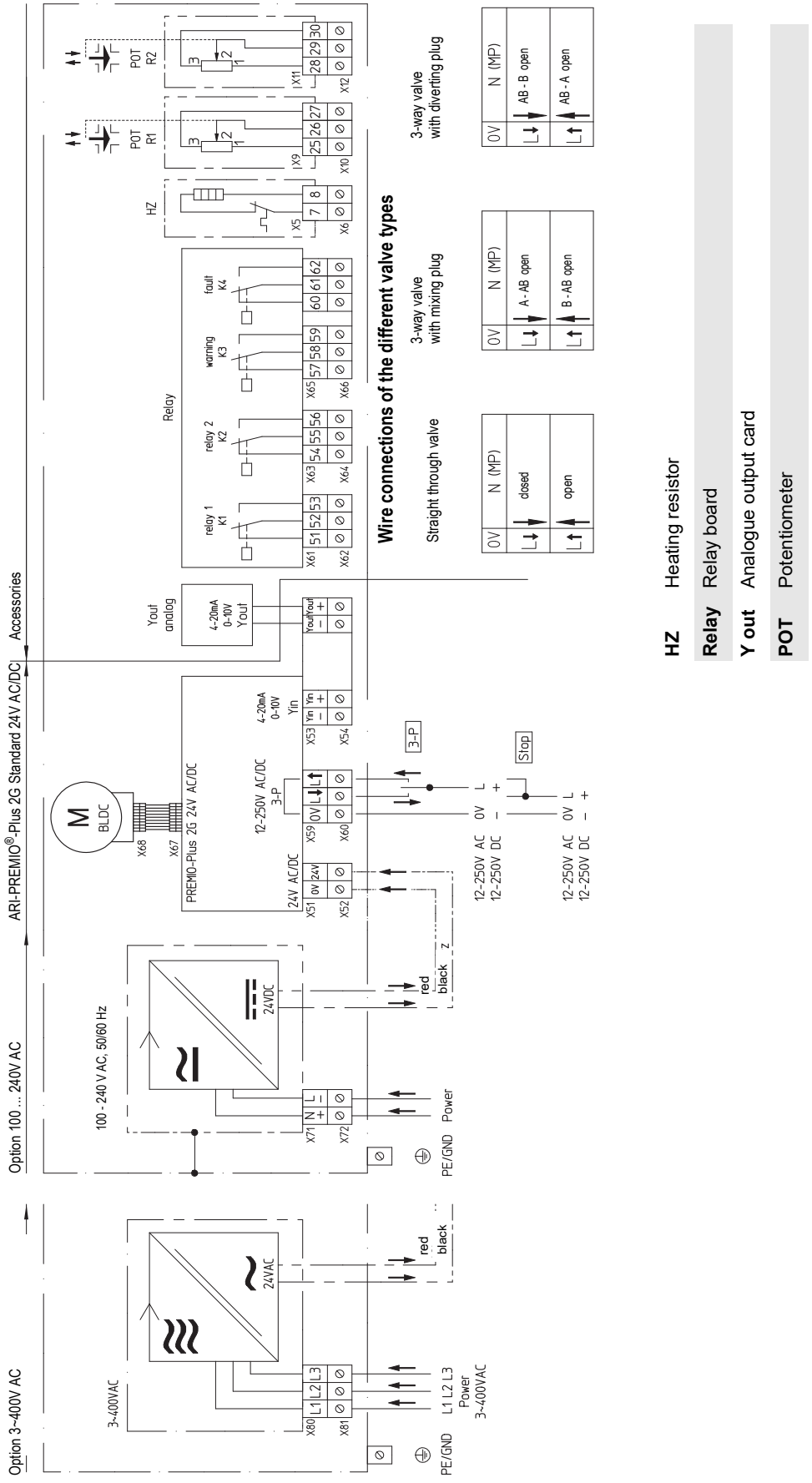


Fig. 8

5.4.2 Wiring diagram ARI-PREMIO®-Plus 2G 2,2 - 25 kN dTRON316

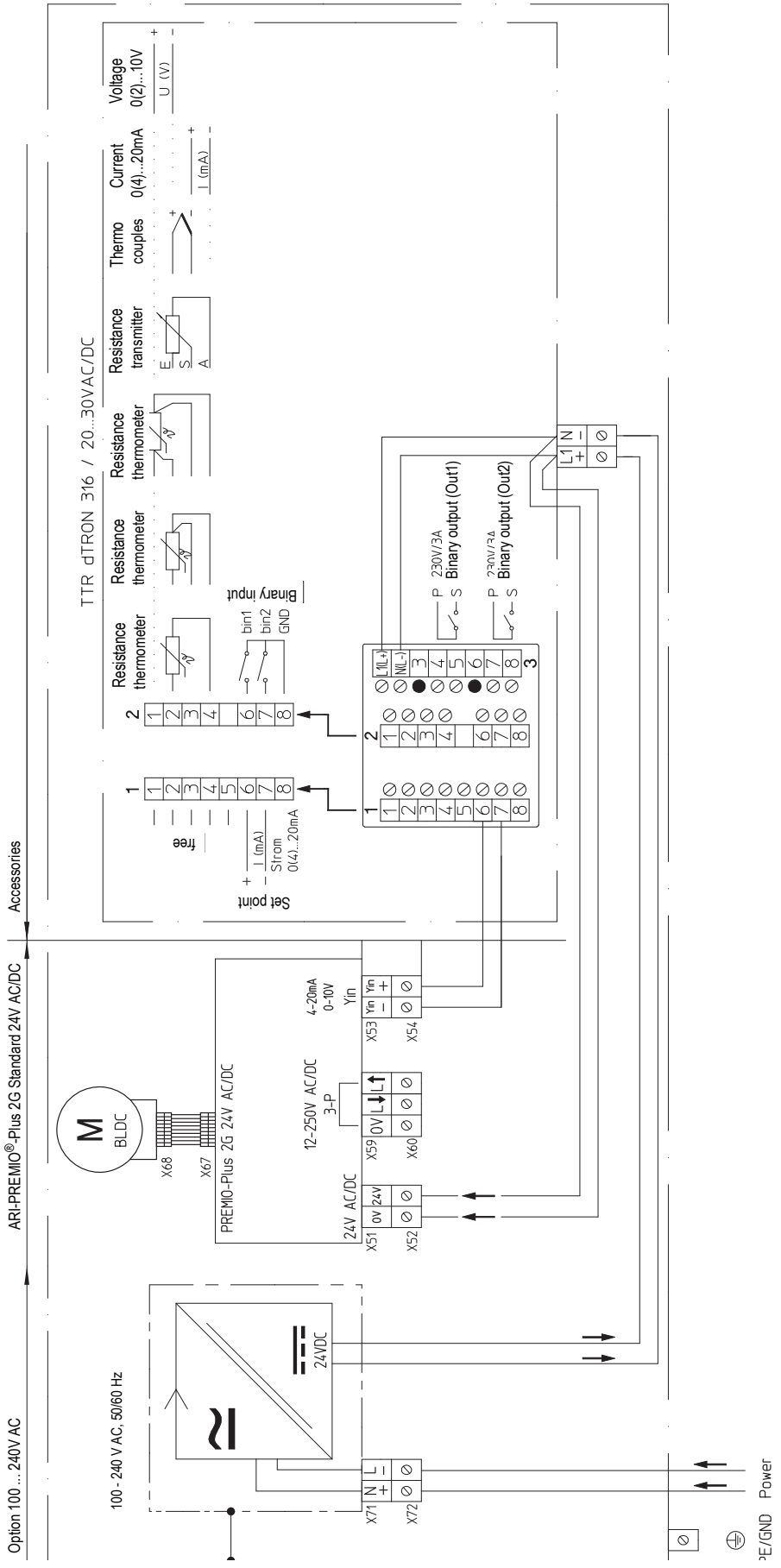


Fig. 9

5.4.3 Connection

Fig. 10: The complete electronics are delivered on the board support.

ATTENTION !

- Work on electrical systems or equipment must only be carried out by qualified electricians or by trained individuals under the guidance and supervision of a qualified electrician in compliance with regional electrical requirement and regulations.

- When connecting the electronics the supply line must be disconnected from the mains (not live) during connection work. It must be impossible to switch the power on unintentionally while the mains are disconnected in this way. Failure to comply may result in death, serious injury or substantial damage to property.

- The mains voltage must coincide with the values indicated on the rating plate.

- Never touch live parts while carrying out adjustments!

- Exercise particular caution when working with voltages higher than 24 V!

- Never insert or withdraw modular isolating terminals that are still live!

- Only one actuator can be connected.

- The actuator lift range must not be overtravelled when carrying out adjustments; risk of damage.

- Make sure the motor connected in the actuator is switched off in the final positions according to the travel or torque.

The following points should be taken into account in addition to the general principles governing installation work:

- All electrical installation work carried out on the plant must comply with current regional regulations.
- The mains voltage must match the information given on the rating plate of the thrust actuator.
- Choose the optimum line cross-section according to the available driving power and line length.
- It is recommended to use a mains fuse with 10 A on the system side.
- A separator in the system for disconnecting the actuator from the mains should be located nearby and easily accessible.
- For flexible cables: Use ferrules according to DIN 46228.

- Single conductors with safety extra-low voltage (< 50 V) must be laid/fastened into the actuator separately from single conductors with low voltage (50 - 1000 V) or they must be separated by reinforced insulation.
- Single conductors must be bundled per connector strip directly behind the terminal with a cable tie, so that a loosened cable cannot get to other parts/circuits.

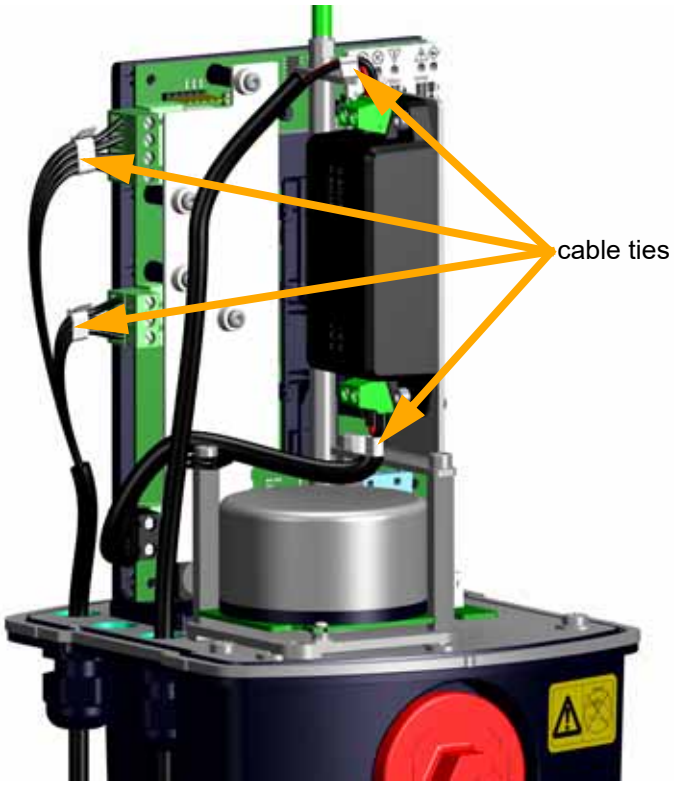


Fig. 11: Single conductors with cable ties

5.5 Settings - Handling

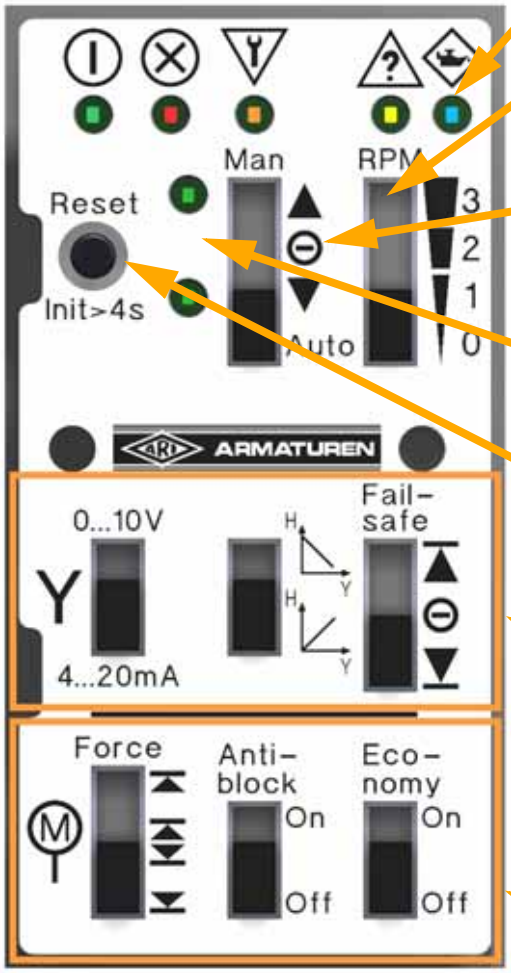
ATTENTION !

- The thrust actuator may only be operated for a short time without the hood for unavoidable setting operations to the electronics, the relay board and the electrical options. While these operations are in progress, the thrust actuator has hazardous, live, uninsulated parts exposed as well as moving and rotating parts.

- Improper execution of the setting operations or lack of care may cause death, grievous bodily injury or substantial property damage.

- Operation of the thrust actuator without the hood for any purpose other than that described above is strictly prohibited.

5.5.1 Display and operating elements of the standard electronics



LEDs for status information

Rpm / operating speed adjustment

RPM = rounds per minute

Local operation of the actuator

- Up, stop, down
- Auto: The actuator follows the control signals

Led`s blinking for travel in open / close direction and lit continuously in end position

Reset button or start / cancel initialization run

Configuration of the analogue control signal

- Current / voltage
- Inversion
- Failsafe behaviour in case of control signal failure

Actuator functions

- Force off (tight closing function)
- Anti-block retraction program
- Economy - wear reduction program

Fig. 12

5.5.2 LEDs

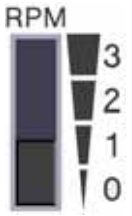
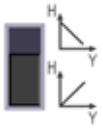
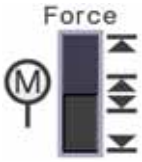
LED	Colour	Meaning	Description / explanation
	**Green**	Power	The electronics are connected to the power supply
	**Red**	Failure	The actuator cannot reach the setpoint / desired position
	**Orange**	Function check	Blockage, manual mode (handwheel or slide switch)
	**Yellow**	Out of specification	This LED lights up if the following parameters are exceeded: - CDF (cyclic duty factor) - Temperature range - Blinking during the initialization run
	**Blue**	Maintenance	Trip slide is dirty - Please clean

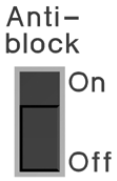
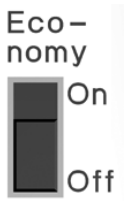
5.5.3 Switch functions

NOTE !

Factory setting: All slide switches down.

Switch	Meaning	Description / explanation
Actuator control switches		
	Reset button or start / cancel initialization run	The Reset button re-launches the software and restores the factory settings. Any faults that are stored are cleared (blockage, etc.). If you press the Reset button for longer than two seconds, the actuator control starts an initialization run. The yellow "Out of specification" LED blinks as long as the initialization run is active. The actuator **automatically** travels to the two final positions in order to determine the valve lift. You can cancel the initialization run by pressing the Reset button again or by sliding the "Man" switch.
	Local operation of the actuator	This 4-step slide switch takes priority over all other inputs and system states. In the ▲ position (up) the driving spindle is inserted into the gearbox until the corresponding travel switch is actuated. In the **"Stop"** position, the motor is de-energised. In the ▼ position (down) the driving spindle is withdrawn from the gearbox until the corresponding travel switch is actuated. In the **"Auto"** position the actuator follows the control signal. Two LEDs indicate the direction of the driving spindle.

<table>
<tr><th>Switch</th><th>Meaning</th><th>Description / explanation</th></tr>
<tr><td> 
</td><td>Rpm / operating speed adjustment</td><td>
<table>
<tr><th colspan="2">Step</th><th>2,2/5,0 kN</th><th>12/15 kN</th></tr>
<tr><td>3</td><td>2600 U/min</td><td>1,00 mm/s</td><td>0,79 mm/s</td></tr>
<tr><td>2</td><td>1250 U/min</td><td>0,47 mm/s</td><td>0,38 mm/s (default)</td></tr>
<tr><td>1</td><td>1000 U/min</td><td>0,38 mm/s (default)</td><td>0,31 mm/s</td></tr>
<tr><td>0</td><td>660 U/min</td><td>0,25 mm/s</td><td>0,20 mm/s</td></tr>
</table>
</td></tr>
<tr><td colspan="3">Configuration switches for the analogue control signal</td></tr>
<tr><td> 
</td><td>Voltage or current signal</td><td>This slide switch Y can be used to select a 0 to 10 V voltage signal or a 4 to 20 mA current signal. The setting applies to both the control signal input and output.</td></tr>
<tr><td>  </td><td>Invert control signal</td><td>This slide switch inverts the analogue control signal (input and output).
Switch up:
Inverted: 0 V or 4 mA = driving spindle retracted
Switch down:
Normal: 0 V or 4 mA = driving spindle extended</td></tr>
<tr><td> 
</td><td>Fail-safe behaviour in case of control signal failure</td><td>In case of a control signal failure (control signal < 3,6 mA) or a cable break (0 - 10 V and 4 - 20 mA) the set position is approached:
·End position UP
·STOP
·End position DOWN</td></tr>
<tr><td> 
</td><td>Force off</td><td>The Force switch specifies the direction in which the actuator is switched off by the thrust in the final position.
- Switch up: Retracting spindle
- Mid-position: Both directions
- Switch down: Extending spindle
The tight closing function is active in the set final position(s) to ensure that the valve is closed with the nominal actuator force.
The function is activated within a capture range equivalent to 4% of the travel upstream of the Force switch, causing the actuator to be moved into the "Thrust off" position. It does not leave this position until the analogue control signal exceeds the 4% threshold again.
If the Force switch for a final position is not activated by the parameter switch, the actuator is switched off in the final position according to the travel.</td></tr>
</table>

Switch	Meaning	Description / explanation
	Anti-block retraction program	**Anti-Block On:** If the valve stem or plug is blocked (i.e. if the thrust is reached before the final position), an intelligent retraction algorithm attempts to remove the blockage. The plug is raised a maximum of four times (the lift is increased with each new attempt) until the blockage is no longer present. If the blockage cannot be removed, the orange LED is set. **Anti-Block Off:** The retraction algorithm is deactivated. The orange LED is set if a blockage occurs.
	Economy - wear reduction program	The wear on the valve and actuator mechanism can be reduced to a minimum by implementing various protective measures to extend the lifetime. **Economy On:** This operating mode affords maximum protection for the valve and actuator mechanism as follows: - Adaptive hysteresis band (refer to 5.6.1) - Temperature management on (see 5.6.2) **Economy Off:** The actuator must respond as quickly as possible: - Fixed hysteresis band - Temperature management off - Yin control signal starts immediately when the power is returned

5.6 Special functions

5.6.1 ECONOMY-Wear reduction program

The **Economy ON** position is designed to minimise wear.

In this position an adaptive hysteresis band (also referred to as the dead band) is applied to the desired position in order to reduce the wear on the valve and the actuator.

The desired position is determined by the analogue control signal Yin, or if the actuator is set to 3-point operation by the length of the control pulses, which are then converted to a desired position by the electronics.

The factory setting for the hysteresis band is ±0.5%. If the desired position remains within the hysteresis band relative to the actual position, the change is ignored. The actuator is only corrected if a larger deviation occurs outside the hysteresis band

If the actuator signal changes direction more than six times in one minute because all deviations of the desired position were outside the current hysteresis band, the band is widened and the next larger step set.

There are six possible hysteresis steps:

Step	Hysteresis band
1	±0,5 %
2	±1 %
3	±2 %
4	±3 %
5	±6 %
6	±10 %

If the actuator specifies fewer than two direction changes within one minute, the next lower step is set.

5.6.2 Temperature management

The aim of the temperature management function is to prevent internal overheating. The temperature of the printed circuit board is measured close to the controller for this purpose and divided into the following categories:

Step	Temperature	Reaction
1	> 80 °C	CDF = 80 %
2	> 90 °C	CDF = 50 %
3	> 110 °C	CDF = 20 %, yellow LED lights up (out of specification)

"CDF" is the cyclic duty factor of the actuator motor. It describes the ratio of motor running time to motor running time plus idle time.
Temperature management is only active in Economy mode. Step 3 is also effective if Economy mode is deactivated.

5.6.3 Condensation on the printed circuit board

A condensation sensor is mounted on the printed circuit board of the basic module. If condensation occurs, a 4 W board heater is switched on as long as the motor is idle.
The power resistors installed in the heater are soldered onto the board.

The function is deactivated if the printed circuit board heats up to more than 60 °C.

5.6.4 "Y-in" signal failure

With analogue control, an interrupted control signal is detected by the electronics (both 4 to 20 mA and 2 to 10 V). If the control signal fails for longer than ten seconds, the red **"Failure"** LED is set and the actuator is switched to **"Stop"**.

As soon as a control signal is detected at the input again for longer than ten seconds, the red LED goes out and the actuator returns to the desired position

5.6.5 Double control at the 3-point input

The 3-point control signal takes priority over the analogue input signal, e.g. for fail-safe or anti-freeze protection. If a signal is present at both inputs (double control), the control mode is interrupted.

5.6.6 Priorities

The actuator is controlled according to the following priorities:

Priority	Control
High	- Reset
↓	- Initialization (cancelled by reset)
↓	- Manual: Stop / up / down
↓	- Failure
↓	- Ext. input L-down
↓	- Ext. input L-up
Low	- Y-input

5.7 Options

ATTENTION !

- The thrust actuator may only be operated for a short time without the hood for unavoidable setting operations to the electronics, the relay card and the electrical options. While these operations are in progress, the thrust actuator has hazardous, live, uninsulated parts exposed as well as moving and rotating parts.

- Improper execution of the setting operations or lack of care may cause death, grievous bodily injury or substantial property damage.

- Operation of the thrust actuator without the hood for any purpose other than that described above is strictly prohibited.

5.7.1 Relay card

Scope of supply:

Pcs.	Designation
1	Relay card
2	3-pole connector, 2,5mm²
1	6-pole connector, 1,5mm²

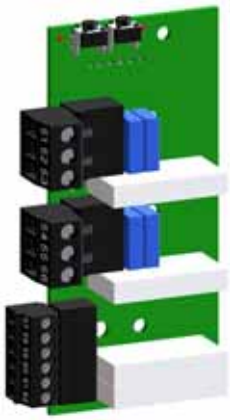


Fig. 13

5.7.1.1 Operating principle

The relay card is a digital expansion module for the ARI-PREMIO®-Plus 2G control electronics. It has four relays for signalling system states and positions digitally to a higher-level control or for connecting relays 1 and 2 to local power consumers (pumps, butterfly valves, etc.).

Two buttons are provided for programming two positions. If a position is overtravelled, the corresponding travel-dependent relay is switched.

The switching states of the travel-dependent relays are indicated by two LEDs

Relay	Function	Corresponding LED
1	Programmed position is overtravelled upwards	Red "Up" LED on the relay card
2	Programmed position is overtravelled downwards	Red "Down" LED on the relay card
3	Warning	Orange, yellow or blue LED on the motherboard
4	Failure	Red LED on the motherboard

NOTE !

*The Failure relay is **switched (high) in normal operation**.*

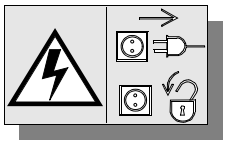
If a fault occurs, the relay drops out to enable a mains voltage or electronics failure to be signalled as well.
The relays are not switched if the handwheel is adjusted or an initialization run is started.

If a position is programmed for a switched Force switch, e.g. in a final position, the corresponding relay is only switched if this Force switch is actuated, regardless of the position. This can be the case if a blockage occurs, for instance. A blockage additionally results in a "Failure" signal because the desired position cannot be reached.

5.7.1.2 Technical data

Type	Relay			
	1 Position	2 Position	3 Warning	4 Failure
Switching capacity: U_B	250 V ~ 6 A inductive load/3 A ohm resistive load		30 V AC/DC ~ 2 A	
Type	Floating changeover contacts			
Max. conductor cross-section	2,5 mm²		1,5 mm²	
Contact material	Gold		Gold	
Storage temperature	-40 °C ... +85 °C			
Operating temperature	-20 °C ... +70 °C			

5.7.1.3 Installation procedure



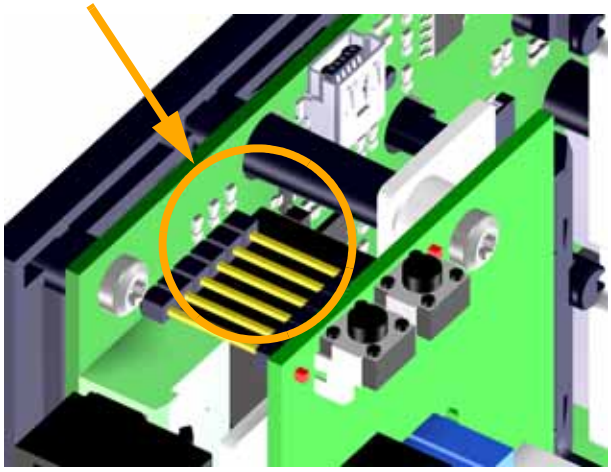


Fig. 14

Fig. 15

5.7.1.4 Electrical connection

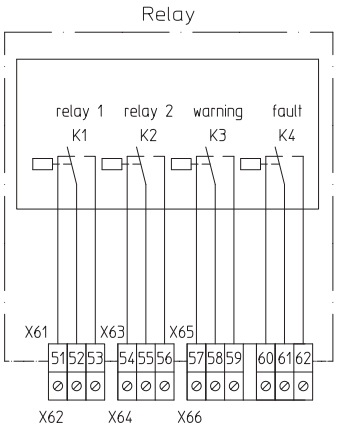


Fig. 16

5.7.1.5 Operation – Programming / clearing positions

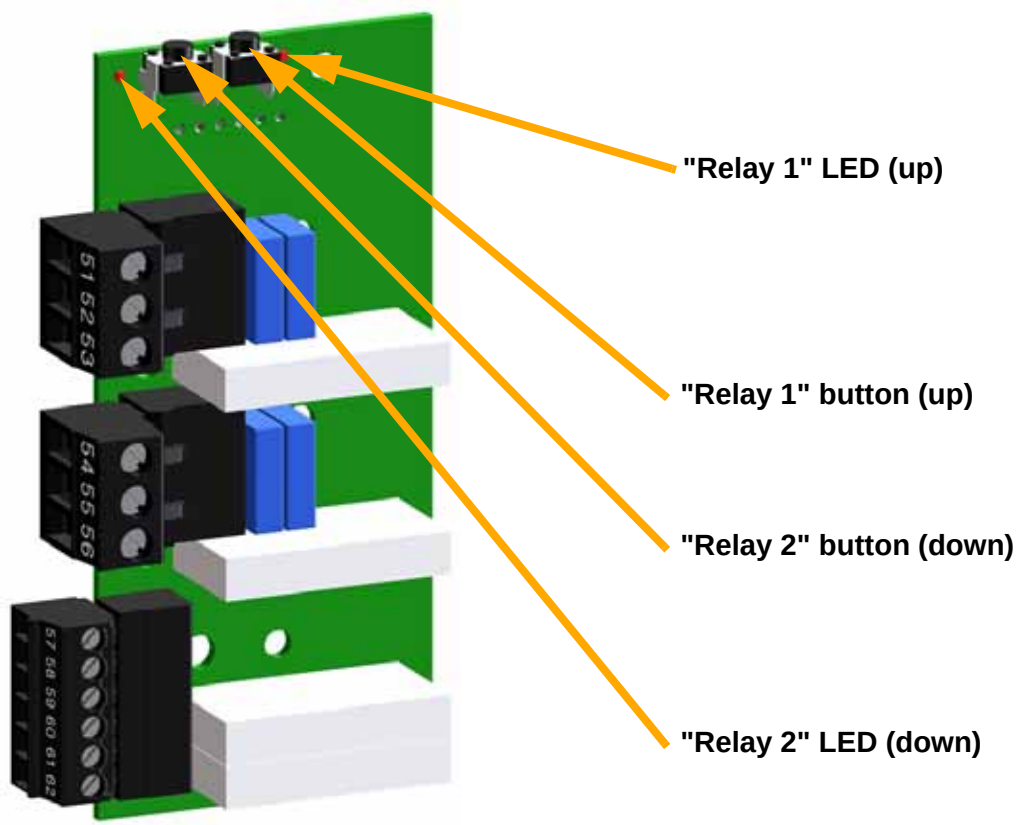


Fig. 17

Programming	Procedure
Relay 1	- Approach the spindle position. - Press "Relay 1 button (up)" until the corresponding LED blinks once. - From now on, relay 1 is switched to "active" when the current position is overtravelled in the UP direction.
Relay 2	- Approach the spindle position. - Press "Relay 2 button (down)" until the corresponding LED blinks once. - From now on, relay 2 is switched to "active" when the current position is overtravelled in the DOWN direction.
Clear	- Press "Relay 1 button (up)" AND "Relay 2 button (down)" simultaneously for longer than one second - Both LEDs blink once to confirm the new setting. - From now on, the two relays are no longer switched.
Overwrite	Similar to Prog. Rel.1 or Prog. Rel.2. The new position automatically overwrites the old position.
Test	Move the spindle to and fro with any type of control (e.g. MAN switch) and watch the LEDs.

5.7.2 Analogue output card - Y_{out}

Scope of supply:

Pcs.	Designation
1	Analogue output card
2	PT screws

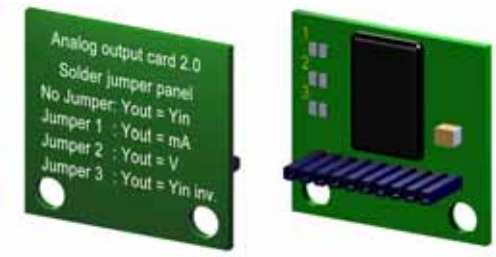


Fig. 18

5.7.2.1 Operating principle

The actual position of the driving spindle can be signalled with the analogue output card.

The connector for the output signal is already mounted on the motherboard.

The feedback signal (4 to 20 mA, 0 to 10 V or inverted) corresponds to the switch configuration on the motherboard (standard product).

The output signal can be changed with a solder jumper irrespective of the switch setting and the input signal which is present (from SW ≥ 3.5.0)

The characteristic correction function has **no effect** on the output signal

5.7.2.2 Technical data

Type	Analogue output card - Y_{out}
Output control signal Y_U	0 - 10 V DC - Measuring resistance (load): max. 2 kOhm Burden
Output control signal Y_I	4 - 20 mA DC, active - Measuring resistance (load): max. 500 Ohm

5.7.2.3 Installation procedure

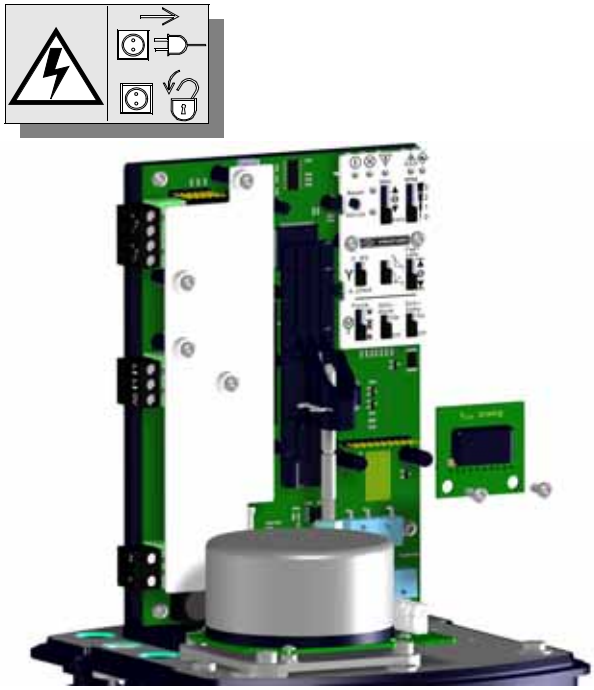


Fig. 19

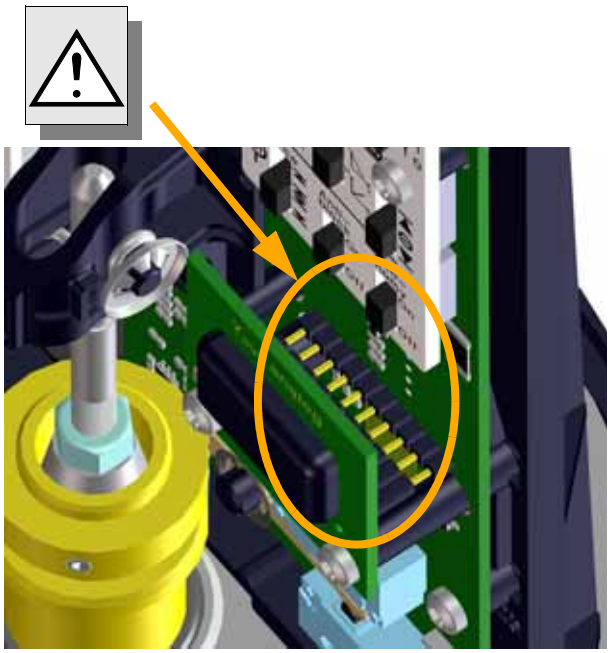


Fig. 20

5.7.2.4 Electrical connection

Fig. 21

5.7.3 Communications package

Scope of supply:

Pcs.	Designation
1	BT-Module incl. myPREMIO App and electr. positioner
1	LED-Status indicator

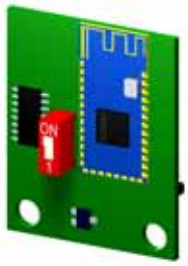


Fig. 22

5.7.3.1 Operating principle

A wireless connection to a mobile device can be established via the interface using the BT module. You can then display status information or select special functions. The myPREMIO App is required for this purpose. The module includes analogue position feedback. The BT module can be switched on or off with the ON / OFF switch. Position feedback is always active.

5.7.4 Bus systems - ANYBUS-Module

5.7.4.1 Operating principle

The ARI-PREMIO®-Plus 2G actuator can be equipped with an ANYBUS module from software version 3.5.0. ANYBUS modules are available for many different bus systems such as Profibus DP, Modbus RTU, etc.

The actuator can be controlled, and (diagnostic) data exchanged with the control system, by means of the various bus systems.

The parity, e.g. for the Modbus, the bus address and the bus termination resistance are set by means of DIP switches on the ANYBUS module.

Please ask ARI-Armaturen for the address assignment for your particular bus system.

5.7.4.2 Installation procedure

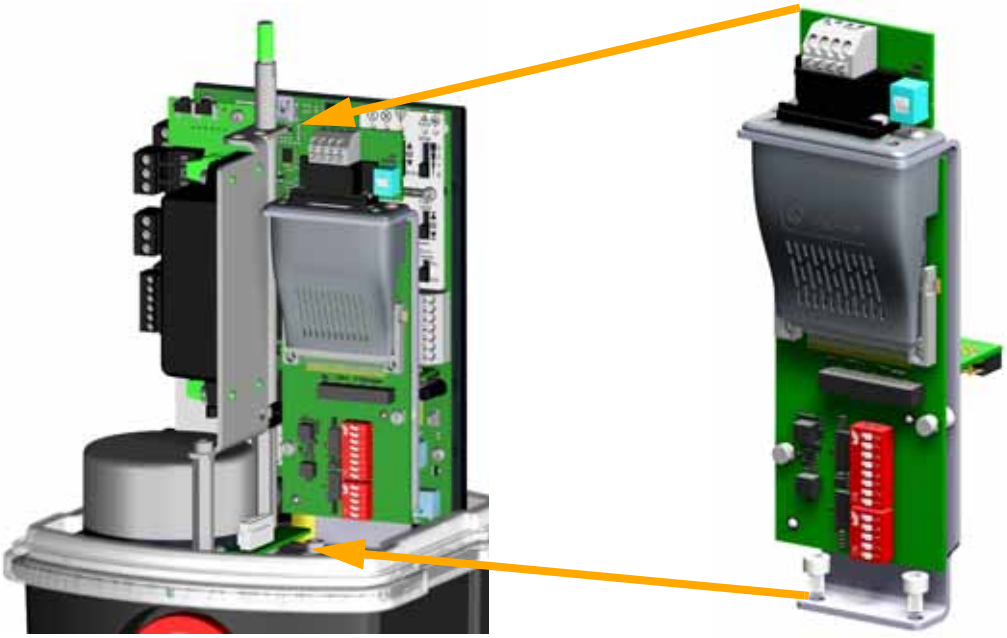


Fig. 23

5.7.4.3 Bus termination resistance

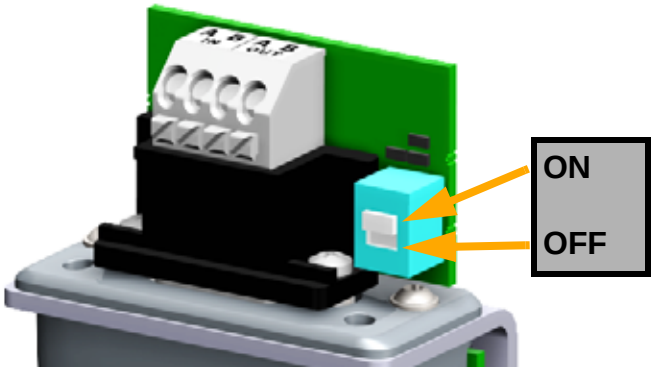


Fig. 24

5.7.4.4 Switch assignment

The communication parameters such as parity, baud rate and Modbus address are set by means of DIP switches on the bus card.

Fig. 25

Parity/Baud

The first two DIP switches of the 5-switch block determine the parity and the number of stop bits for communication. DIP switches 3 to 5 define the baud rate.

Function	DIP-Switches				
	Parity		Baud		
	1	2	3	4	5
Event parity, 1 stop bit (default)	0	0			
Odd parity, 1 stop bit	0	1			
No parity, 2 stop bits	1	0			
No parity, 1 stop bit	1	1			
2400 bps			0	0	1
4800 bps			0	1	0
9600 bps			0	1	1
19200 bps			1	0	0
38400 bps			1	0	1
57600 bps			1	1	0
76800 bps			1	1	1
115200 bps (default)			0	0	0

Bus adress

The bus address is set by means of the DIP switches in the 8-switch block. Addresses between 1 and 247 are allowed with the ANYBUS Modbus RTU module.

The address is entered with the DIP switches using a binary system. Each switch has double the value of the previous one:

DIP-Switch	1	2	3	4	5	6	7	8
Corresponding value	1	2	4	8	16	32	64	128

Example: To set the address 17

DIP-Switch	1	2	3	4	5	6	7	8
Corresponding value	*1*	2	4	8	*16*	32	64	128

Set DIP switches 5 + 1 to ON. Their values correspond to the address 16 + 1 = 17.

5.7.5 Heating

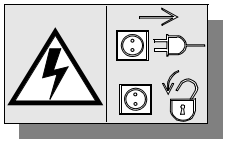
A heating resistor should be fitted as a means of protection against the formation of condensation water in cases involving widely varying ambient temperatures, high atmospheric humidity (outdoor use) and temperatures below the freezing point. The heating resistor is self-regulating so that a continuous supply of current merely needs to be connected up.

5.7.5.1 Installation of heating

On principle, the heating can be combined with all options. It is completely mounted on a holding bracket.

To install the heating proceed as follows:

- Switch-off mains voltage and safeguard to prevent it from being switched back on again accidentally.
- Loosen hexagon screw on the hood, remove carefully hood.
- Using the supplied screws, mount complete heating (on holding bracket) at the point on the gearbox cover plate provided for the purpose. (Fig. 26).
- Lead continuous-current cable (mains voltage = rated voltage of heating) through cable inlet into thrust actuator and fix in place with inlet.
- Strip continuous-current cable approx. 1 - 1,5 cm above cable inlet.
- Strip individual conductors approx. 5mm away from the end and provide with conductor end sleeves.
- Lay the individual conductors in such a way that they do not come into contact with moving parts.
- Connect the individual conductors up to the connection terminal block in accordance with the wiring diagram.
-



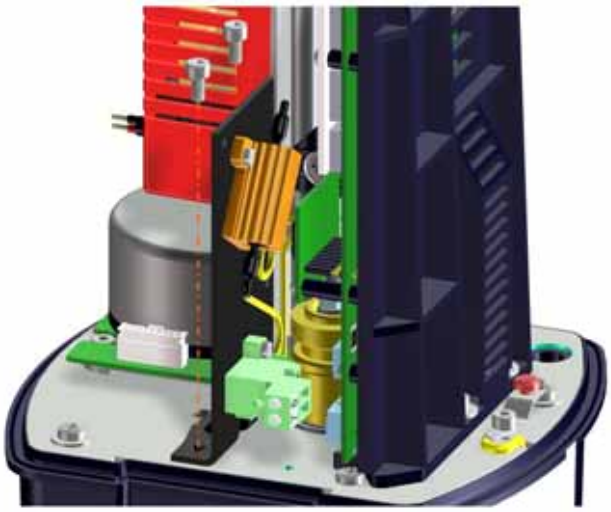


Fig. 26: Heating installation ARI-PREMIO®-Plus 2G 2,2 - 25 kN

Pos.	Designation
50.83.1	Holding bracket (Option: heating)
50.83.2	Head cap screw DIN 84 - M3 x 8
50.83.3	Thermal circuit breaker

Pos.	Designation
50.83.4	Jack strip
50.83.6	Connector, 2-pole
50.83.10	Heating resistor

5.7.6 Power supply

5.7.6.1 Installation and connection of the power supply

Fig. 27: Installation and connection of the power supply ARI-PREMIO®-Plus 2G 2,2 - 5 kN

Fig. 28: Installation and connection of the power supply ARI-PREMIO®-Plus 2G 12 - 15 kN

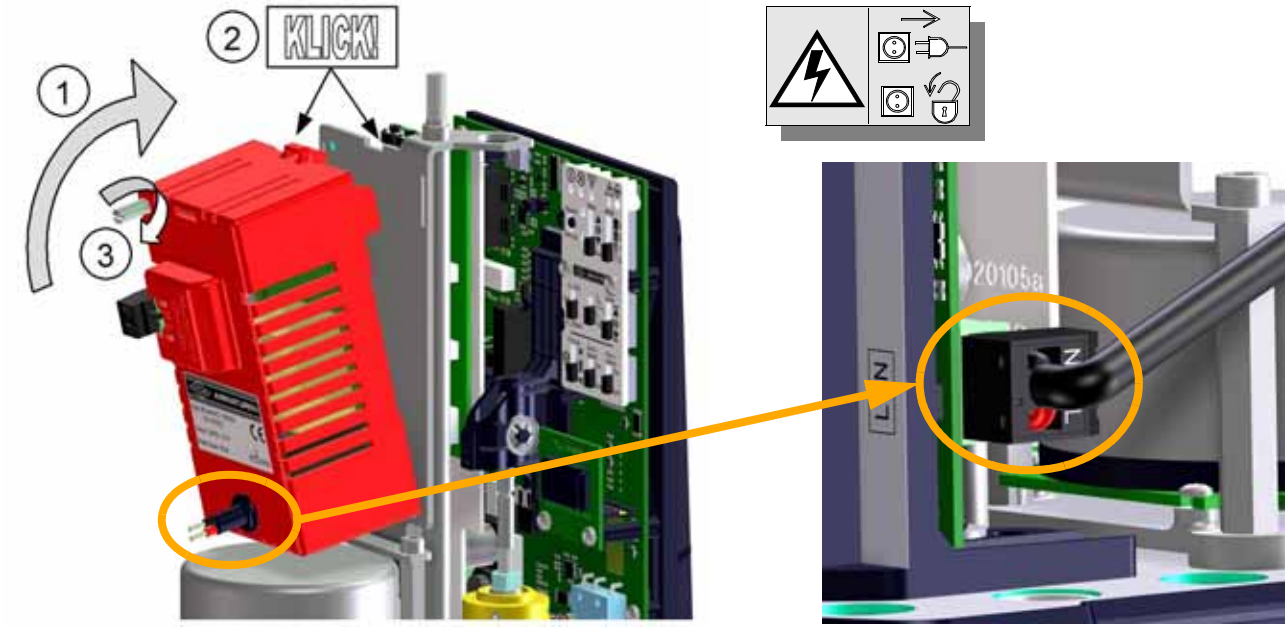


Fig. 29: Installation and connection of the power supply ARI-PREMIO®-Plus 2G 9 kN fail-safe function and ARI-PREMIO®-Plus 2G 25 kN

5.7.7 LED-Status Indicator

5.7.7.1 Installation of LED-Status Indicator

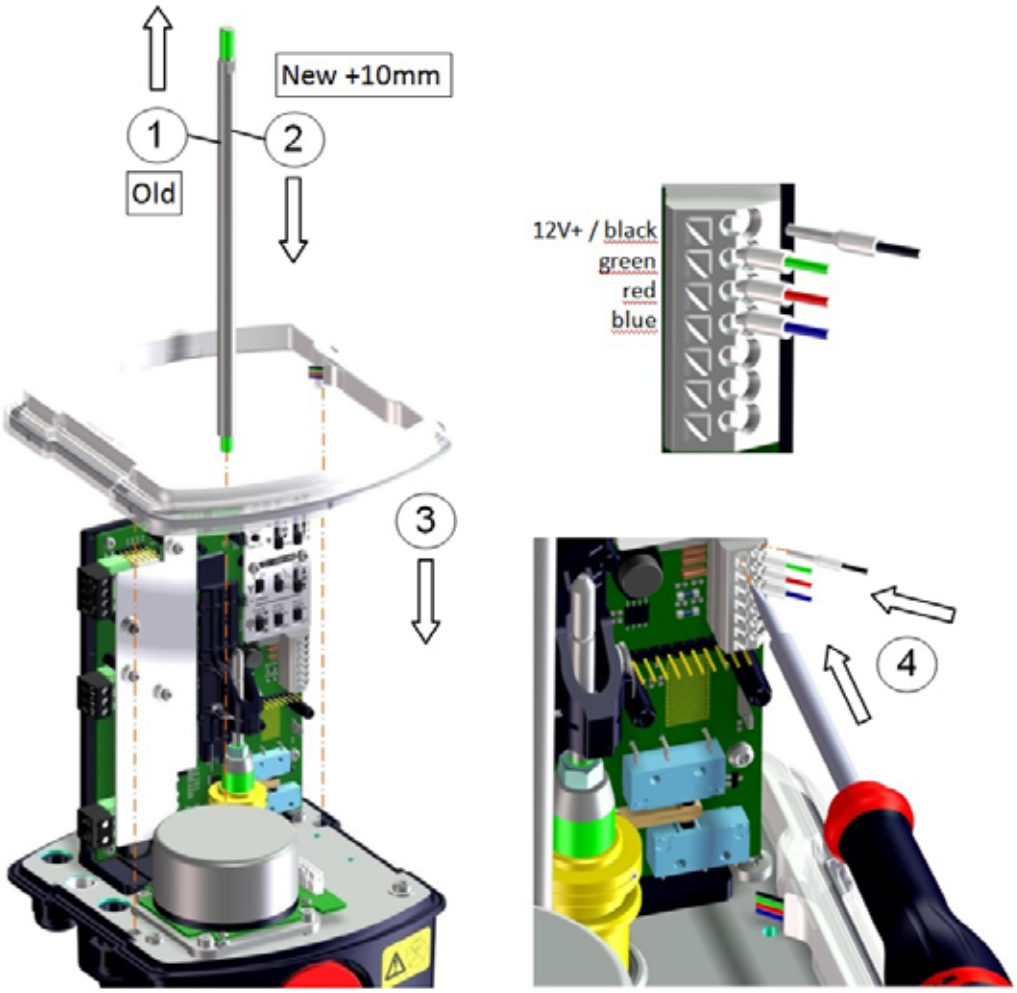


Fig. 30: Installation and connection of the LED-Statu indicator

5.7.8 Integrated (Process-) controller dTRON 316

The JUMO dTRON 316 process controller is designed for controlling temperature, pressure and other process variables. As a temperature controller TR according to DIN EN 14597, the devices are used in heat generating plants to control the temperature of liquids or gases.

In the PREMIO®-Plus 2G the dTRON is employed as a continuous controller. The controller software includes a program or ramp function, parameter set changeover, two autotuning (self-optimization) procedures, a math and logic module as well as 4 limit comparators.

A setup program is available for user-friendly configuration from a PC.

5.7.8.1 Installation of the dTRON 316

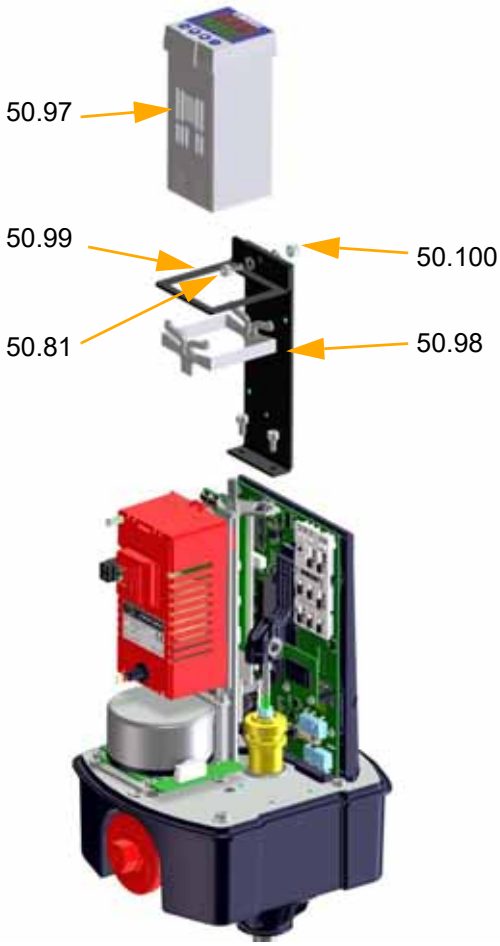
The dTRON 316 can be mounted in the ARI-PREMIO®-Plus 2G as a complete unit with a mounting kit.

To install the dTRON 316 proceed as follows:

In addition to „5.4 Electrical connection“, the electrical connection of the dTRON 316 has to be done in the following way:

- Mount the temperature controller on the gear plate by using the specific installation kit (Fig. 31).
- Connect the analogue output signal from terminal strip 1 of the dTRON, terminal 6 (+) and terminal 7 (-), to the plug connector X54, Y_{in} (+) and Y_{in} (-).

- Connect the actual value input and the other connections to the dTRON 316 as shown in the wiring diagram.
- Connect the power supply L1 (+) and N (-) to the dTRON 316.
- You can invert the control signal with the “INV” switch in order to change the working direction of the heating signal for the extending driving spindle.



Pos.	Benennung
50.81	Head cap screw DIN EN ISO 4762 - M4 x 8
50.97	(Process-) controller dTRON 316
50.98	Fixing bracket (Option dTRON)
50.99	Holding bracket (Option dTRON)
50.100	Self-locking nut (Option dTRON)

Fig. 31: Installation dTRON 316 ARI-PREMIO®-Plus 2G 2,2 - 5 kN

6.0 Putting the actuator into operation

ATTENTION !

All local safety instructions must be observed!

Before putting a new plant into operation or restarting a plant after repair or modification, always make sure that:

- The power supply, control signal and ambient temperature coincide with the technical data of the electronics.

- All work has been completed correctly!

The hood is mounted again following the completion of the adjustment work!

6.1 Configuring the control signal

The corresponding control signal (3-point or analogue, 0 to 10 V or 4 to 20 mA) must be connected to the electronics prior to initializing the actuator (refer to 6.3 Initialization).

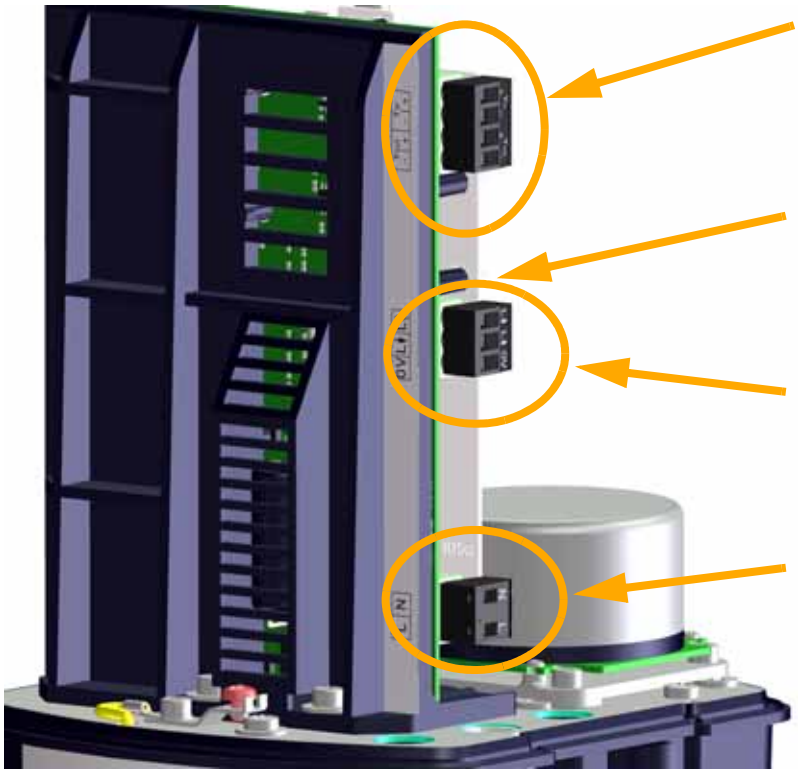


Fig. 32

If a control signal is not present at the analogue input during the initialization run, the electronics are set for 3-point control only. This is indicated by means of a continuously lit LED that is mounted on the printed circuit board directly above the connector for the 3-point signal.

If an analogue input control signal is present, the parameter switch must additionally be set for 0 to 10 V or 4 to 20 mA on the operator panel.

Fig. 33

The actuator can only be controlled with an analogue input signal, and Yin signal failures detected, if an analogue input control signal was detected at the analogue input during the initialization run!

6.2 Connecting the supply voltage

The green status LED should light up when power is connected to the N and L terminals (either directly on the board support with 24 V AC/DC or on the optional switched-mode power supply with 90 to 264 V AC). If not, the power should be disconnected again immediately in order to search for the fault (refer also to 9.0 Troubleshooting table on page 46)!

6.3 Initialization

NOTE !

Automatic mode cannot be activated unless the actuator has been initialized!

After the PREMIO-Plus actuator has been mounted on a valve, it must be initialized in order to determine the full lift and the type of control (3- point or analogue).

The desired control signal must be connected and set for this purpose (refer to 6.1 Configuring the control signal).

You can start an initialization run in any operating mode by pressing the Reset button for longer than two seconds. The yellow "Out of specification" LED blinks when the initialization run is active. The actuator automatically travels to the two final positions in order to determine the valve lift.

You can cancel the initialization run at any time by pressing the Reset button again briefly or by sliding the "Man" switch.

If 3-point control is detected, an LED mounted directly above the 3-point connector lights up continuously.

If analogue control is detected, the LED above the 3-point connector only lights up when the electronics are controlled by a 3-point signal.

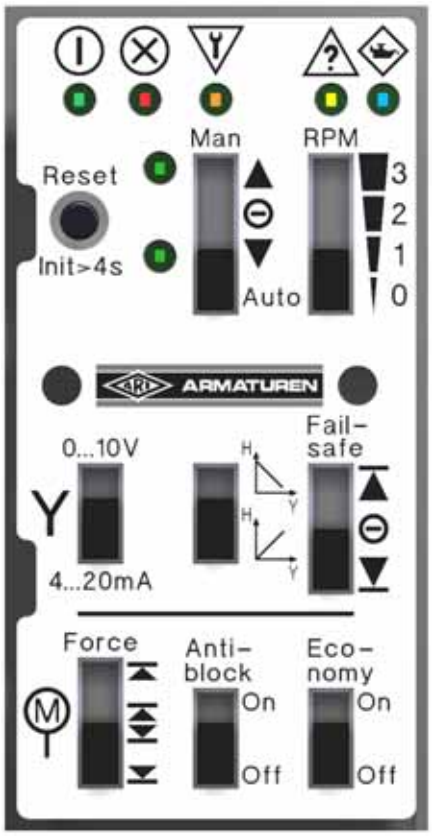


Fig. 34

NOTE !

Drives the actuator during the initialization of its valid travel range, the initialization will be cancelled and the red and yellow LEDs lit. This may cause in an incorrectly set stem excess length, wrong column lengths or even a missing valve.

7.0 Care and maintenance

NOTE !

The power supply cable must be disconnected from the mains (i.e. deenergised) prior to cleaning the electronics. Suitable precautions must be taken to prevent the mains voltage from being re-connected inadvertently.

Non-observance can result in death, severe personal injury or substantial property damage.

The thrust actuator requires very little maintenance. Accordingly maintenance in specified intervals is not necessary.

Remove any externally visible dirt from the actuator and the electronics occasionally, depending on the operating conditions.

No liquid must be allowed to come into contact with or get inside the electronics!

Never clean the actuator using liquids or aggressive solvents or agents that are detrimental to health or highly flammable.

We recommend dampening a cloth with cleaning agent to clean the actuator rather than applying it directly.

8.0 Troubleshooting

In the event of malfunction or faulty operating performance check that the installation and adjustment work has been carried out and completed in accordance with these Operating Instructions.

ATTENTION !

- It is essential that the safety regulations are observed when identifying faults.

If malfunctions cannot be eliminate with the help of the following table „**9.0 Troubleshooting table**“, the supplier or manufacturer should be consulted.

9.0 Troubleshooting table

ATTENTION !

- read point 10.0 and 11.0 prior to dismantling and repair work !
- read point 6.0 before restarting the plant

Fault	Possible causes	Remedy
Green LED does not lit	Power failure	Check the mains power supply
	Operating voltage is incorrect	Connect the operating voltage indicated on the rating plate
	Elektronics have burnt out	Make sure the mains voltage coincides with the value indicated on the rating plate. Replace the electronics.
	Terminal not connected correctly or cable does not make proper contact inside terminal	Insert the terminal securely and check the connecting cable
Actuator starts briefly, then stops and starts again briefly	CDF management is active due to internal overheating	Protect against radiated heat, lag the pipes
Actuator stops for 15 s or does not respond to control signals for 15 s	Actuator has detected a handwheel movement	The motor is not started for another 15 s for safety reasons
4 to 20 mA input signal cannot be set on controller or setpoint selector	ARI-PREMIO®-Plus 2G electronics have no power	Check the power supply to the electronics
Initialization cancelled; red and yellow LEDs lit	Outside the valid travel range	Possible causes: Incorrect fitting projection, refer to point 5.3 Mounting to valves), incorrect column length, valve missing
Red LED lit	Actuator not initialized yet.	Start an initialization run after mounting the actuator on a valve and connecting the control signal
No values or incorrect values at analogue output	Parameter settings are incorrect	Set the parameters as described in 5.5.3 Switch functions
	Analogue output card missing or defective	Replace the analogue output card
Actuator oscillates continuously about a point	Proportional action Xp setting on controller is too low	Increase the Xp value (refer to the controller Operating Instructions)
		or set the ECONOMY switch to ON
	Dead band setting on controller is too low	Increase the dead band value (refer to the controller Operating Instructions)
		or set the ECONOMY switch to ON
	Dirty slide	Clean surface with Greycode (black/white)

Fault	Possible causes	Remedy
Actuator cannot be controlled with analogue control signal	Actuator is set to 3-point operation or is currently controlled by a 3-point signal. Recognizable by a glowing LED nearbyof the 3-point connector.	By withdrawing the connector for the 3-point signal, you can determine whether the actuator is set to 3-point operation or whether it is simply being controlled by a 3-point signal. If the LED goes out, a 3-point signal is present, e.g. from an anti-freezing contact. If the LED is still lit, the actuator is set to 3-point operation. An analogue control signal must be present during the initialization run in order to control the actuator with an analogue signal! Repeat the initialization with an analogue control signal applied
	Switch is set to manual instead of auto.	Set switch to auto.
Actuator not moved into end position by 0 V control signal (control with 0 to 10 V control signal)	There is AC voltage due to induction voltages on the control signal	- Don't lay the signal line directly adjacent to main lines - Use shielded cables for the control signal - Connect a 100 µF to 470 µF capacitor parallel to the signal input
	There is AC voltage (approx. 8.5 V for a 0 V control signal) at the signal input if a common ground is used for the control signal and the 24 VAC power supply (three-wire). This could be due to a wiring error in the 24 VAC power supply for the signal source (e.g. controller)	Check the polarity of the 24 VAC power supply for the signal source (e.g. controller) and if necessary reverse it
	The internal resistance of the signal source, e.g. a controller or PLC, is too high. The measuring voltage for detecting cable breaks no longer collapses completely	Connect a 1000 ohm resistor parallel to the Yin input. ***Note:*** The 1000 ohm resistor should be installed immediately downstream of the signal source to ensure that the actuator's cable break detection function works correctly

9.1 Failure signals according to NAMUR NE 107

Warnings and information messages (blue, yellow or orange LEDs) do not interrupt the control mode!

NE 107	Colour	NAMUR description	ARI-PREMIO®-Plus 2G
Maintenance required	**Blue**	Urgent maintenance required Maintenance required	Currently no function – the limits of use have yet to be determined.
Out of specification	**Yellow**	Out of specification, unsafe due to environmental and process influences	- CDF exceeded - Max. hysteresis - Supply voltage / frequency out of tolerance Toleranzen - Overheating - Moisture: Heating has been on for longer than 1 h
Function check	**Orange**	Configuration change, local operation, substitute value	- Manual mode / local operation The actuator is controlled by the handwheel or locally - Blockage detected
Failure	**Red**	Internal failure Process failure	- Y_{in} interrupted - Blockage - the desired position can no longer be approached - Checksum error - Gear motor damage - Actuator separated from valve (yoke broken, valve stem, etc.) - Valve stem blocked in both directions - Capacitor defective (constant direction changes – not possible to approach a defined position) - Actuator is not initialized yet

9.2 LED-encoding (from software version 2.1.7 and higher)

No initialization run	**Green**	**Red**			
Blockage	**Green**	**Red**	**Orange**		
Y_{in} control signal failure	**Green**	**Red**		**Yellow**	
ADV - outside the travel path	**Green**	**Red**	**Orange**	**Yellow**	
Position kann nicht erreicht werden	**Green**	**Red**	**Orange**		**Blue**
Position can not be achieved	**Green**	**Red**	**Orange**	**Yellow**	**Blue**
Motor error	**Green**	**Red**			**Blue**

10.0 Dismantlement of thrust actuator

ATTENTION !

- The supply line for connecting up the thrust actuator must be in the dead state i.e. disconnected while dismantlement work is being carried out. After being disconnected, the mains power must be prevented from being switched back on again accidentally.

- The system must be run down (depressurised state) as the valve cone is not held without the thrust actuator and would thus be conducted by the system pressure.

- Valve plug approximately in mid lift position - on no account supported inside a seat!

To dismantle the thrust actuator proceed as follows:

- Loosen hexagon nut on the hood, carefully remove hood
- Disconnect all cables led into thrust actuator from outside and remove from thrust actuator.
- Place hood on carefully from above and fix in place with hexagon nut.
- Loosen grub screw inside torsion safety feature; screw coupling out of torsion safety feature.
- Loosen clamping bolts connecting the thrust actuator to the fitting.
- Remove thrust actuator from valve.

11.0 Warranty / Guarantee

The extent and period of warranty cover are specified in the "Standard Terms and Conditions of Albert Richter GmbH & Co. KG“ valid at the time of delivery or, by way of departure, in the contract of sale itself.

We guarantee freedom of faults in compliance with state-of-the-art technology and the confirmed application.

No warranty claims can be made for any damage caused as the result of incorrect handling or disregard of operating and installation instructions, datasheets and relavant regulations.

This warranty also does not cover any damage which occurs during operation under conditions deviating from those laid down by specifications or other agreements.

Justified complaints will be eliminated by repair carried out by us or by a specialist appointed by us.

No claims will be accepted beyond the scope of this warranty. The right to replacement delivery is excluded.

The warranty shall not cover maintenance work, installation of external parts, design modifications or natural wear.

Any damage incurred during transport should not be reported to us but *rather* to the competent cargo-handling depot, the railway company or carrier company immediately or else claims for replacements from these companies will be invalidated.

ARI-Armaturen Albert Richter GmbH & Co. KG, D-33750 Schloß Holte-Stukenbrock
Telephone (+49 5207) 994-0 Telefax (+49 5207) 994-158 or 159
Internet: https://www.ari-armaturen.com E-mail: info.vertrieb@ari-armaturen.com

12.0 Translated Declaration of Incorporation and Conformity

ARI-Armaturen
Albert Richter GmbH & Co. KG
Mergelheide 56-60, D-33758 Schloß Holte-Stukenbrock, www.ari-armaturen.com

Translated Declaration of Incorporation of Partly Completed Machinery
EC-directive 2006/42/EC and EC-/EU declaration of conformity
as defined by the EC-directive about electromagnetic compatibility 2004/108/EC,
the EU-directive about electromagnetic compatibility 2014/30/EU,
the EC-Low voltage directive 2006/95/EC,
the EU-Low voltage directive 2014/35/EU
and the EU-directive 2011/65/EU (RoHS II)

for the supplied model of ARI electric thrust actuators:

- **ARI-PACO 2G**
- **ARI-PREMIO**
- **ARI-PREMIO-Plus 2G inclusive accessories**

ARI-Armaturen GmbH & Co. KG as facturer herewith declares, that the products mentioned above meet the following basic requirements of the Machinery Directive (2006/42/EC):

Annex I, articles 1.1.2, 1.1.3, 1.1.5, 1.2.1, 1,2,2, 1.2.6, 1.3.2, 1.3.4, 1.3.7, 1.3.8, 1.5.1, 1.5.2, 1.5.3, 1.5.4, 1.5.5, 1.5.6, 1.7.1, 1.7.3, 1.7.4

The following harmonised standards have been applied:

- DIN EN ISO 12100: 2011-03 + Berichtigung 1: 2013-08
- EN 60204-1: 2006

ARI-thrust actuators are designed for assembling with valves.
ARI-thrust actuators must not be put into service until the final machinery, into which they are to be incorporated has been declared in conformity with the provisions of the EC Directive 2006/42/EC.
The relevant technical documentation pertaining to the machinery described in Annex VII, part B has been prepared. With regard to the partly completed machinery, the manufacturer commits to submitting the documents to the competent national authority via electronic transmission upon request.

Authorised person for documentation: Dieter Richter

The thrust actuators further meet the requirements of the following european directives and the respective approximation of national laws:

1. **EC-directive about electromagnetic compatibility 2004/108/EC** (valid until 19. April 2016)
   EU-directive about electromagnetic compatibility 2014/30/EU (valid from 20. April 2016)
   The following harmonised standards have been applied:
   EN 61000-6-3: 2007 + A1: 2011; EN 61000-6-2: 2005
2. **EU-Low voltage directive 2006/95/EC** (valid until 19. April 2016)
   EU-Low voltage directive 2014/35/EU (valid from 20. April 2016)
   The following harmonised standards have been applied:
   EN 60204-1, EN 60335-1, EN 60730-1, EN 60730-2-14
3. **EU-directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2011/65/EU (RoHS II)**

Schloß Holte-Stukenbrock, 15.07.2016

.....
(Brechmann, Managing director)

The declaration certifies the conformity with the mentioned directives, it does not contain any warranty of properties in the sense of the product liability lay, however. The safety hints of the product information supplied with the product must be observed. In case of a modification of the applieance not agreed with the manufacturer and of non-observance of the safety hints this declaration loses its validity.