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MVP1 pre-production product.
Technical data of the series part are coming soon

SMART MECHATRONIX
SMART FLEX EFFECTOR
TECHNICAL DATA

GENERAL PRODUCT DESCRIPTION

The Smart Flex Effector is a sensor-assisted compensating element which uses high-resolution position sensors to record deviations in the position of the tool with respect to the work piece and converts these data into active manipulator correction movements.

This compensation takes place passively via the compensating element freedom of movement in all 6 degrees of freedom. The deflection is recorded by high-resolution sensors and can be queried via an interface. The element can also be blocked and returned to the zero point via the interface. The Smart Flex Effector can be used in conjunction with all common robotic platforms or Cartesian systems. Data are transferred serially. The serial connecting cable provides the power supply.

TECHNICAL DATA

Designation	Unit	Value
Compensation path XY	[mm]	± 2.8
Compensation path Z	[mm]	- 3
Compensation angle XY	[°]	± 1.5
Compensation angle Z	[°]	± 3.5
Handling weight	[kg]	0.05 - 25
Spring reset force	[N]	2.5 – 25*
Locking force	[N]	min. 11
Locking time	[s]	min. 0.3
Manipulator connection	[ISO]	9409-1-50-4-M6
Net weight	[kg]	0.75
Ambient temp.	[°C]	5 – 50
Protection class	[IP]	64
Measuring tolerance XYZ	[mm]	± 0.08*
Measuring tolerance RxRyRz	[°]	± 0.12*

Housing material	Hard anodized aluminum
Power supply	(15-)24V DC 0.6A
Maintenance	Maintenance free dry lubrication

*Empirical, non-validated approximate values.

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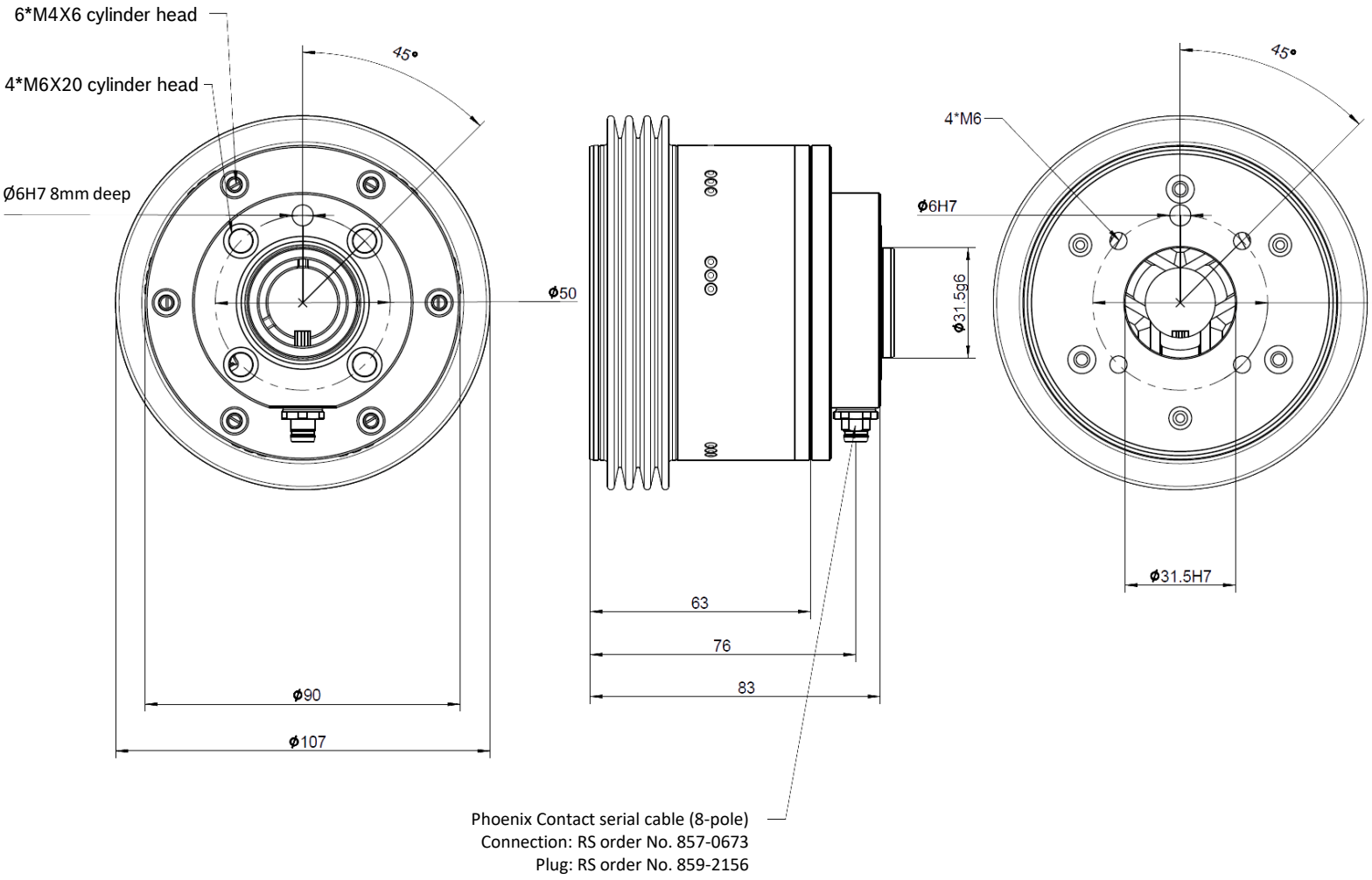
SMART FLEX EFFECTOR
GEOMETRIC DIMENSIONS

ROBOT-SIDE FLANGE

Adapter plate directly attaching the Smart Flex Effector to a flange fitting in accordance with ISO 9409-50-4-M6

TOOL-SIDE FLANGE

Adapter plate with ISO 9409-50-4-M6 screw fitting



SMART FLEX EFFECTOR
INTERFACE DESCRIPTION

PROTOCOL

Communication takes place via a serial interface using “strings”.

Establishing a connection:

The following parameters should be selected when establishing a connection

- Baud Rate →9600
- Bits →8
- Parity →none
- stopBits → 1
- timeout →0

PIN LAYOUT

The supplied signal cable is connected to the built-in plug. The layout of the cable is as follows.

White	→	RxD
Brown	→	TxD
Green	→	Gnd
Yellow	→	Reset
Gray	→	empty
Pink	→	DigIn
Blue	→	0V
Red	→	24V

INITIALIZATION

Work through the following functions to initialize the Smart Flex Effector:

CTR;SERIAL

SET;VEL;100

CTR;LOCK

CTR;INIT

CTR;UNLOCK

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SMART FLEX EFFECTOR
INTERFACE DESCRIPTION

rexroth
A Bosch Company

SCOPE OF FUNCTIONS

The functions which can be executed via string transfer are listed below. Generally speaking, the functions are subdivided into GET, CTR, SET and EVENT.

GET functions

Send: GET;LOCK/n

Receive: GET;LOCK;true or GET;LOCK;false/n

Interaction Type: TwoWay

Receive Payload: BOOL

Description of function: Get limit position switch “locked”

Send: GET;UNLOCK/n

Receive: GET;UNLOCK;true or GET;UNLOCK;false/n

Interaction Type: Twoway

Receive Payload: BOOL

Description of function: Get limit position switch “unlocked”

Send: GET;POSDATA/n

Receive: GET;POSDATA;0|0|0|0|0|0/n

Interaction Type: Twoway

Receive Payload: PositionSensorData

Description of function: Get distance sensor raw values

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Send: GET;LOCKTIMEOUT/n

Receive: GET;LOCKTIMEOUT;800/n

Interaction Type: Twoway

Receive Payload: INT32

Description of function: Get max. time for locking process

Send: GET;UNLOCKTIMEOUT/n

Receive: GET;UNLOCKTIMEOUT;800/n

Interaction Type: Twoway

Receive Payload: INT32

Description of function: Get max. time for unlocking process

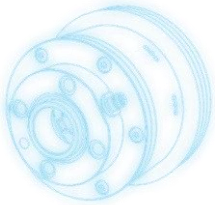
Send: GET;VEL/n

Receive: GET;VEL;100/n

Interaction Type: Twoway

Receive Payload: INT32

Description of function: Get locking voltage acc. to speed



SMART FLEX EFFECTOR
INTERFACE DESCRIPTION

Send: GET;VER/n

Receive: GET;VER;0.2.2/n

Interaction Type: Twoway

Receive Payload: Firmware No.

Description of function: Get firmware version

Send: GET;POSE/n

Receive: GET;POSE;-0.004284|0.003554|0.003478|-0.003022|0.003022|0.005220/n

Interaction Type: Twoway

Receive Payload: XYZRxRyRz position

Description of function: Get offset (position of the adjusting plate)

Send: GET;POSE_TIME/n

Receive: GET;POSE_TIME;0.000534|0.003393|0.001739|-0.010560|0.007838|0.006035|9|2|1|1|0|2|1/n

Interaction Type: Twoway

Receive Payload: XYZRxRyRz position, Time for Calculation, PositionSensorData

Description of function: Get the offset, the calculation time and the associated sensor raw data

SET functions

Send: SET;VEL;100/n

Receive: SET;VEL/n

Interaction Type: Twoway

Description of function: Set locking voltage acc. to speed

Send: SET;LOCKTIMEOUT;800/n

Receive: SET;LOCKTIMEOUT/n

Interaction Type: Twoway

Description of function: Set max. time for locking process

Send: SET;UNLOCKTIMEOUT;800/n

Receive: SET;UNLOCKTIMEOUT/n

Interaction Type: Twoway

Description of function: Set max. time for unlocking process

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SMART FLEX EFFECTOR
INTERFACE DESCRIPTION

CTR functions

Send: CTR;LOCK/n

Receive: EVENT;LOCKSUCCESS;true/n or EVENT;LOCKSUCCESS;false/n

Interaction Type: Twoway

Description of function: Trigger locking process

Send: CTR;UNLOCK/n

Receive: EVENT;UNLOCKSUCCESS;true/n or EVENT;UNLOCKSUCCESS;false/n

Interaction Type: Twoway

Description of function: Trigger unlocking process

Send: CTR;SERIAL/n

Receive: CTR;SERIAL/n

Interaction Type: Twoway

Description of function: Activate control of the lock via serial

Send: CTR;DIGIN/n

Receive: CTR;DIGIN/n

Interaction Type: Twoway

Description of function: Activate control of the lock via digital input

Send: CTR;INIT/n

Receive: CTR;INIT|0|0|0|0|0|0

Interaction Type: Twoway

Receive Payload: Sensor reference position

Description of function: Compare position calculation as regards origin (should be carried out in locked state)

Send: CTR;BAUD;115200/n

Receive: CTR;BAUD;115200/n

Interaction Type: Twoway

Send Payload: Baud rate

Description of function: Set the baud rate

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