

HART Additional Board for SMARTCON Control

1 General

When ordering an actuator, HART (Highway Adressable Remote Transducer) is one of many possible field-bus interfaces available for SCHIEBEL actuators of the ACTUSMART and SMARTCON series. The decision about the communication interface of the actuator should be decided before setting an order for an actuator. Although retro fitting is possible, it might require a series of costly adjustments and should only be performed by SCHIEBEL service technicians or equally skilled third parties.

HART is a bi-directional communication protocol that provides data access between intelligent field instruments and host systems. Standard 4-20mA wiring practices assure reliable communication. (for further information visit <https://fieldcommgroup.org/technologies/hart>).

The setpoint connection is also for the HART communication. The setpoint can be either changed analog or over the HART communication.

A DTM (Devices Type Manager) for the PACTware™ will be provided.

2 Commissioning

The HART interface of a SCHIEBEL actuator is already placed upon delivery, no further actions are required.

All necessary files for the Master-Set up can be downloaded at <http://actuators.schiebel.com>.

If HART is activated the following menu points will be added to your control unit (ACTUSMART, SMARTCON).

	Menu Item	Subitem	Options	Explanation/Comments
P15.1	HART	HART	0: disabled	HART disabled
			1: enabled	HART is enabled
			2: enabled +	HART is enabled, regular writing on command and setpoint is monitored.
P15.2	HART	Watchdogtime	0,0-60,0s {0,0s}	Monitoring of the toggle bit transmitted from the master (bit 7 in the command). With a bus watchdog time set, this bit has to toggle within that time; otherwise there is a bus watchdog error. At 0.0 s the watchdog function is disabled, in which case toggling of the toggle bit may be omitted
P15.3	HART	Setpoint Source	0: Standard	The setpoint is specified via HART (only relevant when the positioner is enabled)
			1: Analog	The setpoint is specified by the analogue signal (only relevant when the positioner is enabled)
			2: Bus/Analog	With a fault-free bus, the setpoint is specified via the HART. With a bus error, the analogue value is switched to (only relevant when the positioner is enabled)
			0: Ignore	Bus fault or watchdog timeout is ignored.

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	Menu Item	Subitem	Options	EExplanation/Comments
P15.4 ¹⁾	HART	Bus Monitor	1: Stop	The actuator stops in case of a bus fault or watchdog timeout.
			2: Open	The actuator moves to the open position in case of a bus fault or watchdog timeout.
			3: Close	The actuator moves to the closed position in case of a bus fault or watchdog timeout.
			4: Emergency Position	The actuator moves to the emergency position (see parameter P8.5) in case of a bus fault or watchdog timeout.
			5: Emergency Open	The actuator moves to the open position with a superimposed run command in case of a bus fault or watchdog timeout.
			6: Emergency Close	The actuator moves to the closed position with a superimposed run command in case of a bus fault or watchdog timeout.
			7: Last Valid Value	The actuator moves to the last valid value set by the setpoint register (see chapter ?? on page ??) in case of a bus fault or watchdog timeout
			8: Failsafe	The actuator moves to the failsafe position in case of a bus fault or watchdog timeout (only for failsafe actuators).

The setpoint is specified via HART (only relevant when the positioner is enabled)

3 Description of the Input and Output Data

3.1 Output data (slave to master)

3.1.1 Primary Value:

Setpoint input value: 0,0... 100,0%
The readback of the setpoint value

3.1.2 Secondary Value:

Actual position: 0,0... 100,0%

3.1.3 Tertiary Value:

Actual torque value: -200,0% ... +200,0%

3.1.4 Quaternary Value:

Actual external value: 0,0 ... 100,0%

3.1.5 Extended Status:

Status: Bitfield
Structure:

¹⁾FW1515 or higher

Bitnr.:	Funktion:	Beschreibung:	
		Bit = 0	Bit = 1
0	READY	-	Actuator is ready
1	END LIMIT OPEN	-	End position OPEN reached (taking into account the type of command termination (torque-or travel-dependent))
2	END LIMIT CLOSE	-	End position CLOSED reached (taking into account the type of command termination (torque-or travel-dependent))
3	TRAVEL OPEN	-	Travel end position OPEN reached (not taking into account the type of command termination (only straightforward travel information))
4	TRAVEL CLOSE	-	Travel end position CLOSE reached (not taking into account the type of command termination (only straightforward travel information))
5	TORQUE OPEN	-	Cut-out torque in OPEN direction has been exceeded
6	TORQUE CLOSE	-	Cut-out torque in CLOSE direction has been exceeded
7	MOTORTEMP.	-	Motor temperature sensor has responded (overtemp.)
8	OPENING	-	The actuator is operating by motor OPEN
9	CLOSING	-	The actuator is operating by motor CLOSE
10	LOCAL	-	Selector switch in position LOCAL
11	REMOTE	-	Selector switch in position REMOTE
12	LOCK OPEN	-	Locking OPEN is active. OPEN command is queued with the highest priority and will not be locked even in the end POSITION (see command for bits 10 an 12)
13	LOCK CLOSE	-	Locking CLOSE is active. CLOSE command is queued with the highest priority and will not be locked even in the end Position (see command for bits 10 an 12)
14	LIVEBIT 1	Livebit 1 toggles every second	
15	LIVEBIT 2	Livebit 2 is the copy from the watchdog toggle bit (see command bit 7)	

3.2 Modules for the input data (data from master to slave)

3.2.1 Command:

Command: Bitfield

Structure:

Bit no.:	Function:	Description:	
		Bit = 0	Bit = 1
0	OPEN	-	OPEN command in REMOTE mode
1	CLOSE	-	CLOSE command in REMOTE mode
2	STOP	-	STOP command in REMOTE mode
3	NOT-AUF	-	EMERGENCY OPEN command in LOCAL & REMOTE modes
4	NOT-ZU	-	EMERGENCY CLOSE command in LOCAL & REMOTE modes
5	BLOCK	-	BLOCK drive in LOCAL & REMOTE modes. The drive is not operable either via the selector switch locally nor via commands by REMOTE nor HART.
6	CONTROL INHIBIT	-	CONTROL INHIBIT in REMOTE mode Engagement of the positioner is suppressed
7	WATCHDOG	Toggle bit from the master for bus watchdog monitoring With bus watchdog time set, the bit has to toggle within this time; otherwise there is a bus error.	
8	OPEN-SH	-	OPEN command with self-retention in REMOTE mode jettison with STOP
9	CLOSE-SH	-	CLOSE command with self-retention in REMOTE mode jettison with STOP
10	LOCKING- OPEN	-	Trigger locking OPEN (in LOCAL and REMOTE modes) the drive runs OPEN with highest priority, the command continues to queue internally even after reaching the OPEN end position. Jettison only with LOCKING OFF, supply off or OFF mode
11	LOCKING- CLOSE	-	Trigger locking CLOSED (in LOCAL and REMOTE modes) the drive runs CLOSED with highest priority, the command continues to queue internally even after reaching the CLOSED end position. Jettison only with LOCKING OFF, supply off or OFF mode
12	LOCKING OFF	-	Jettison locking
13	BLOCK LOCAL	-	BLOCK drive in LOCAL mode The drive is not operable via the selector switch locally
14	FAILSAFE	-	Trigger the failsafe unit (if there is one)
15	OVERRIDE	-	Binary inputs are not processed

3.2.2 Setpoint:

Setpoint: 0,0... 100,0%

The setpoint value will only be used if the parameter P15.3 (Setpoint source) is set to 0 or 2.

If the mentioned parameter is set to 1 or 2 during a malfunction the analogsignal will be used as setpoint.