The REMOTE CONTROL® Range

Top Quality Valve Actuators
Made in Sweden

RCEL
Profi-Bus with LCU

Instruction

CAUTION

ELECTRICAL SHOCK HAZARD.To avoid serious personal injury, property damage, turn off ALL power to the actuator before removing the cover.

Before installation, verify the nameplate information information to insure the correct model number and voltage of the actuator.

Be sure to completly review the actuator manual prior to operation.

Final limit switch adjustment MUST be done after mounting the actuator to the valve. Incorrect adjustment may cause actuator failure.

Over torque switches are factory set. Tampering with the over torque switch settings may damage the actuator and void the warrenty.

To minimize the possible damage caused by condensation, be sure to energize the heater.

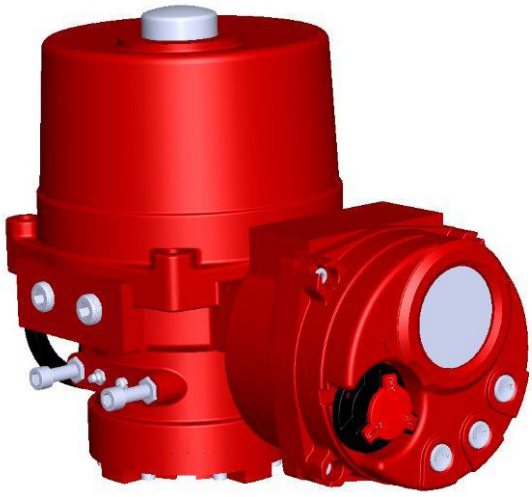
Care should be taken when wiring 3 phase actuators. Confirm proper rotation and limit switch shut-off function during the initial operation. If the actuator rotates in the reverse direction, then the phasing needs to be corrected by switching two of the 3 phase wires on the terminal block.

CAUTION

Explosion-proof products must be used under the temperature and environment appropriate for the product spec.

Flameproof Enclosure Level and Enviroment of Actuator
Ex d IIB T4 -20°C ~ +55°C

Explosion proof actuators and wiring must be properly sealed prior to operation. Improper installation may cause a hazardous condition and failure of the explosion proof enclosure. The manufacture is not responsible for any losses or damages caused by incorrect installation.

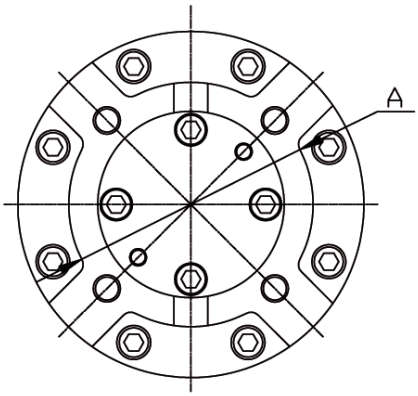


Standard Specification

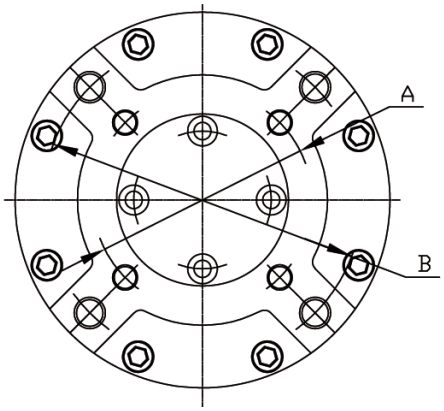
Enclosure	Weatherproof enclosure IP67 Nema 4 and 6 Ex d IIB T4
Ambient temperature	-20 ºC to +55 ºC
Main Power	1PH AC110 / 220V, 50 / 60 Hz
Limit Switches	Open / Close Limit Switch (Max 250VAC 15A)
Torque Switches	Open / Close Torque Switch (Max 250VAC 15A)
Control Unit	1. Non Intrusive Push Buttons (Open / Stop / Close) 2. Non Intrusive Selector Switch (Remote / OFF / Local)
Position Indicator	Digital Display (0~100%)
LED Lamp	Remote / Local / Fault Open / Close
Remote Dry Contact (Max 250VAC 5A)	Full Open / Close Fault Signal Monitor (Remote / Local)
Conduit Entry	PF 3/4" x 2 Option: M20 Pitch 1,5 x 2, NPT 3/4" x 2
Potentiometer	0 ~ 1 kΩ

Actuator Mounting Flange

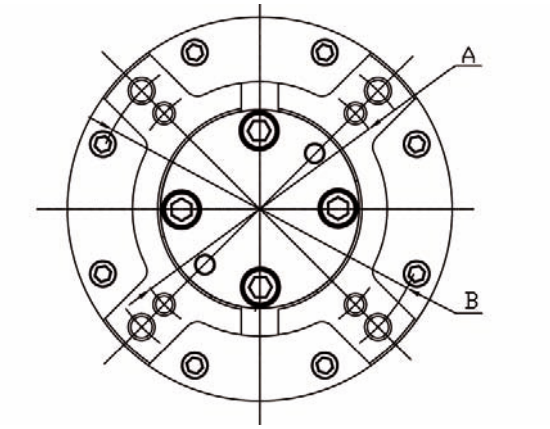
The (NA Series) mounting flange is manufactured to ISO5211 standards. If the actuator does not mount directly to the valve, then a mounting kit will need to be manufactured.



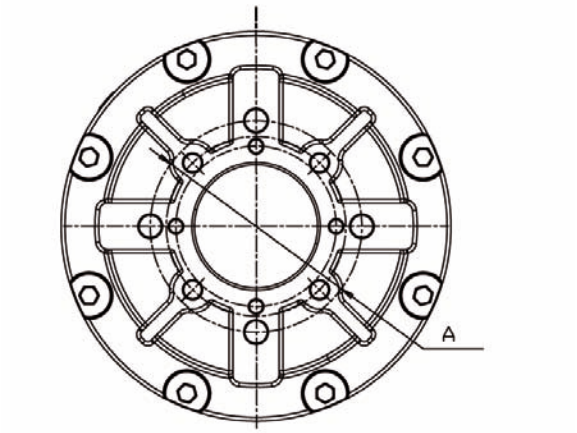
Model	RCEL006, RCEL009



Model	RCEL015 ~ RCEL050



Model	RCEL060 ~ RCEL100



Model	RCEL150 ~ RCEL250

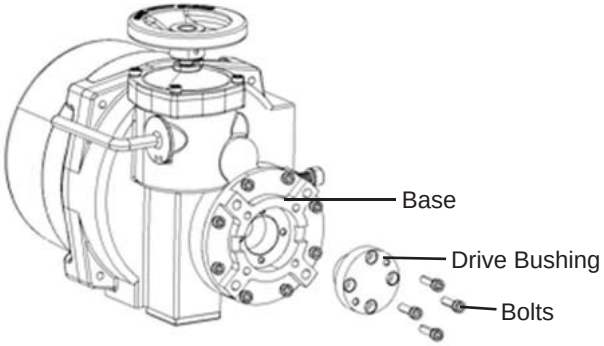
Size		RCEL006-009	RCEL015-019	RCEL028-050	RCEL060-100	RCEL150-250
A	B.C.D	Ø 70	Ø 70	Ø 102	Ø 125	Ø 102
	TAP	4-M8 DP12	4-M8 DP12	4-M10 DP15	4-M12 DP22	4-M10 DP15
	ISO 5211	F07	F07	F10	F12	F10
B	B.C.D	-	Ø 102	Ø 125	Ø 140	-
	TAP	-	4-M10 DP15	4-M12 DP22	4-M16 DP22	-
	ISO 5211	-	F10	F12	F14	-
Option	B.C.D	Ø 82	Ø 82	-	Ø 102	Ø 140
	TAP	4-M8 DP12	4-M8 DP12	-	4-M10 DP15	4-M16 DP22
	ISO 5211	-	-	-	F10	F10

Actuator Drive Bushing

A removable blank drive bushing is suppled witch each actuator that can be machined to adapt to the valve stem.

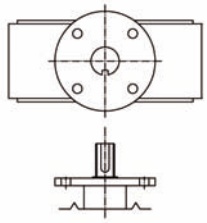
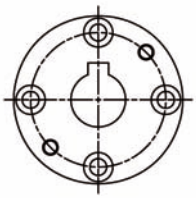
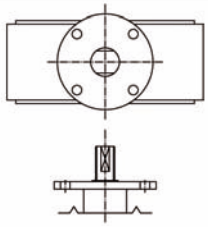
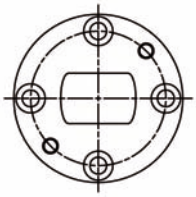
1. Drive Bushing Separation

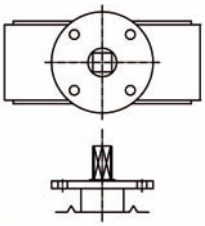
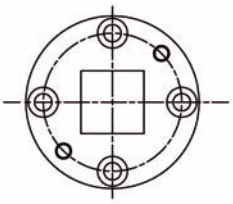
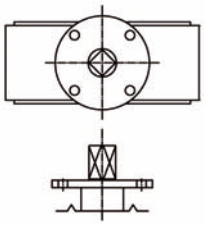
Remove the 4 bolts by using an Allen key and the separated drive bushing from actuator.



2. Drive Bushing Adaption

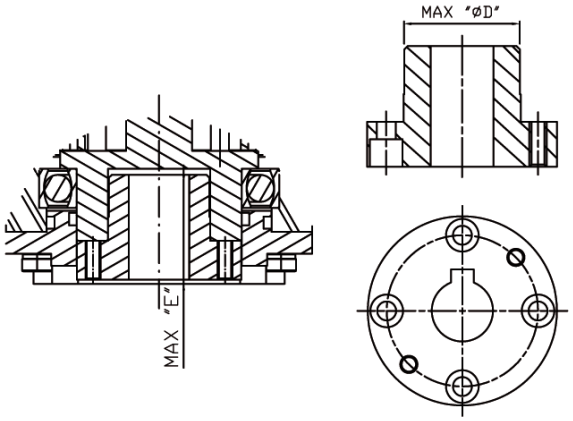
The drive bushing should be machined to match the valve steam dimensions when the valve is in the full open or full closed position. The actuator bushings can be provided machined and ready to mount to the valve if the valve drawings are provided to the manufacture.

Shaft Orientation when Butterfly Valve is in Full Close	Machined Drive Bushing Orientation and Type
	
	

Shaft Orientation when Butterfly Valve is in Full Close	Machined Drive Bushing Orientation and Type
	
	

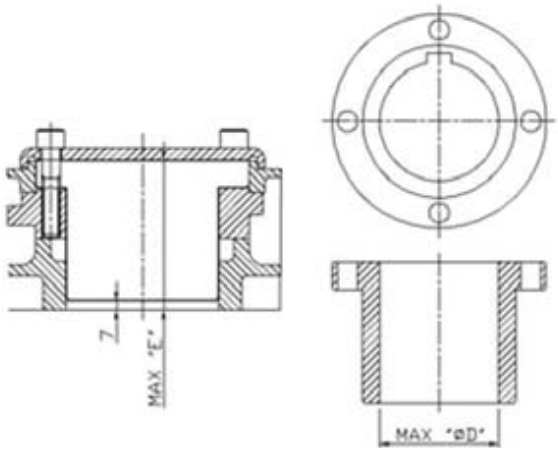
3. Drive Bushing Max Machine Bore Size

Model	RCEL006 ~ RCEL100



	Max Ø D	Max "Squre"	E
RCEL006 ~ 009	Ø 20	20	43
RCEL015 ~ 019	Ø 22	20	43
RCEL028 ~ 050	Ø 32	26	52
RCEL060 ~ 100	Ø 42	34	59

Model	RCEL150 ~ RCEL250



	Max Ø D	Max "Squre"	E
RCEL150 ~ 250	Ø 75	65	100

Manual Operation

1. Pull the lever located on the side of the actuator toward the hand wheel. The lever should “Lock” in position. Rotate the hand wheel and the actuator output will rotate. **Fig. 1**

2. If the lever does not “Lock” in the upright position, then turn the hand wheel halfway and pull lever to the right position.

3. After manual operation, leave the lever as is. When power is re.applied to the actuator, the lever will disengage and declutch the manual override. The actuator motor vill then rotate the valve to the powered position.

4. If the lever does not “Lock” in the manual position while trying to manually operate the actuator, then the actuator gearing may be jammed and needs to be checked.

Limit Switch Setting

1. Confirm that the power is off.
Pull lever located on the side of the actuator to engage the manual override hand wheel. **Fig. 1**
Rotate the handwheel clockwise to fully close the actuator / valve. **Fig. 1**

2. Loosen the closed limit switch cam set screw as shown. **See Fig. 2a.** Rotate the cam in the close / clockwise direction and engage the switch lever to actuate the switch. **See Fig. 2b.**

If auxillary limit switches are included in the actuator, then set the corresponding auxillary switch at this time.

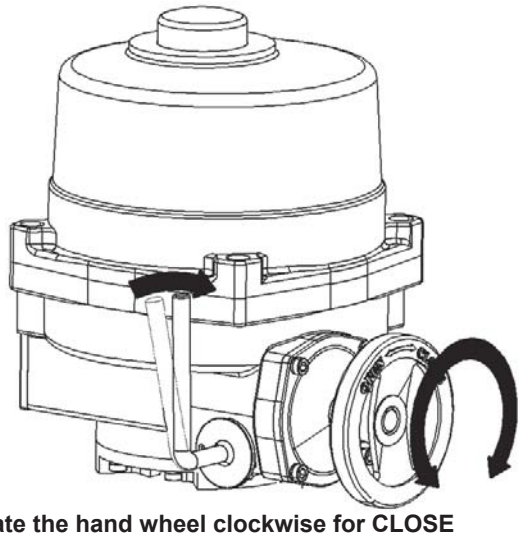
3. Firmly re-tighten the cam set screw.

4. To set the open limit switch, follow the same proceedure as above except that the rotation will be counter clockwise using the open limit switch cam.

Over Torque Switch Setting

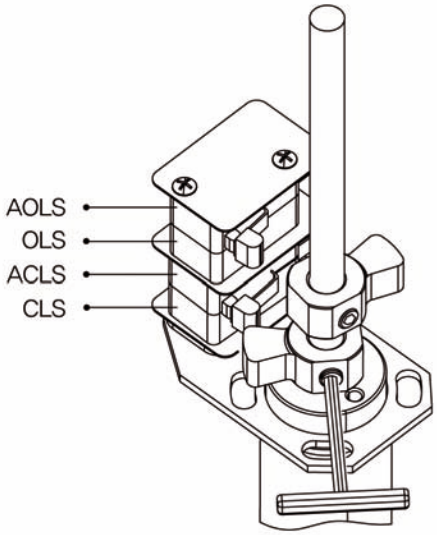
The over torque switches are factory set. Tampering with the over torque switch settings may damage the actuator and void the warranty. For more information contact Rotork Sweden AB

Fig. 1



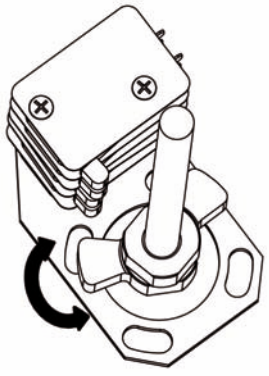
· Rotate the hand wheel clockwise for CLOSE
· Rotate the hand wheel counter clockwise for OPEN

Fig. 2a



AOLS	Dry Contact Open Limit Switch
OLS	Open Limit Switch
ACLS	Dry Contact Closed Limit Switch
CLS	Closed Limit Switsh

Fig. 2b



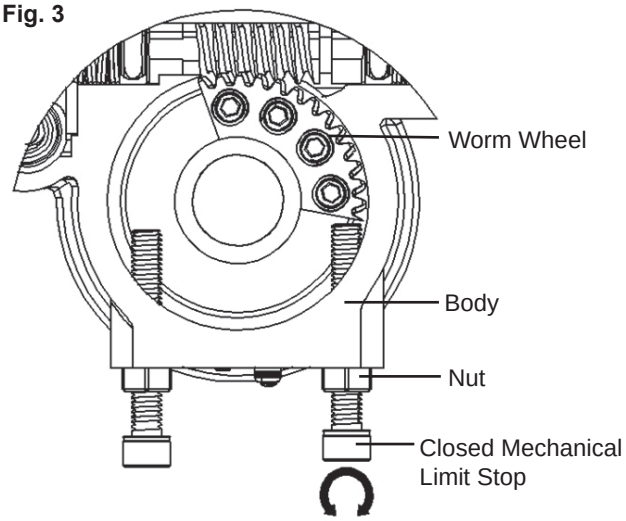
Mechanical Limit Stop Setting

In the event of a limit switch malfunction, the mechanical limit stops will prevent the actuator from over traveling and causing damage to the valve. The mechanical limit stops should be reset whenever any adjustment is made to the open and closed limit switches, this will protect the valve in the event of any electrical malfuntion.

1. Turn the power off to the actuator. Engage the manual override and fully close the valve clockwise.

2. Turn the mechanical limit stop into the body until contact is made between the limit stop and worm wheel. After contact is made, turn the limit stop back out two turns and lock it in place with the nut by tightening the nut against the body. **Fig. 3**

Fig. 3

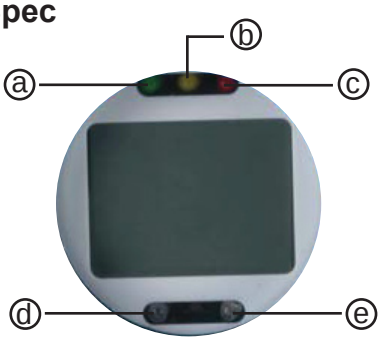


3. To set the open limit stop, follow the above instructions except rotate the actuator in the counter clockwise rotation.

If the mechanical stops are improperly set, motor and gear damage may occur. After setting the limit stops, check for proper function by operating the actuator both manually and electricly. Confirm that the end of travel limit switches shut off power to the motor in both the open and closed positions, and that the motor is not stalled or in an over-torque condition.

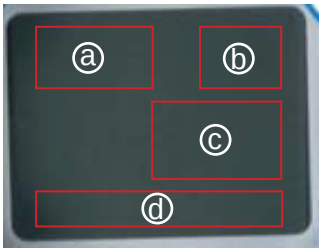
Function of Local Control Unit

Lamp Spec



Marking	Spec
a	Full Open Lamp
b	Fault Lamp
c	Full Close Lamp
d	Remote Lamp
e	Local Lamp

LCD Display



Marking	Spec
a	Actuator Mode Display Remote: Actuator Remote Control Local: Actuator Local Control Off: Actuator Stopp Auto: Actuator Auto Scan Option: P.C.U Set: Actuator Setting
b	Actuator Message Display Open: Full Open Close: Full Close Run: Actuator running Fault: Actuator Fault
c	Actuator 0 ~ 100% Position Display
d	Actuator Falt Item

Push Button

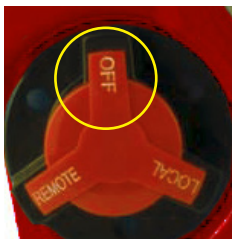
	Local Mode	Off Mode
OPEN	Open Command	Manu Up Scroll

	Local Mode	Off Mode
STOP	Stop Command	2 ~ 3 sec: Enter 1 sec: Escape

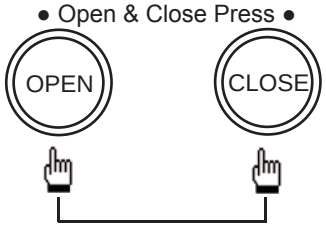
	Local Mode	Off Mode
CLOSE	Close Command	Menu Down Scroll

Actuator Setting

Place the selector switch in “OFF” position and press the open and close button for over 2 seconds to enter the setting mode



● Open & Close Press ●



Setting Menu Up: OPEN (1 sec)

Setting Menu Down: CLOSE (1 sec)

Setting Reset: STOP (1 sec)

Setting Enter: STOP (2~3 sec)

Set Up Menu

INCH / HOLD Two operating modes of Inching / Hold

- **Inching** Push to run
- **Holding** Mantained

ESD DIR Decision of behavior for Emergency shut down signal

- **Close** Actuator move to full close position
- **Open** Actuator move to full open position
- **Stop** Actuator position: Stop

TQ CHECK Decision of the seating method in Limit Position

- **TQ Check On** Open, Close, Over Torque
- **TQ Check Off** Full Open / Close Limit

- You can choose seating method, Limit or Torque.
- The Original set condition would be “Limit” seating when shipped.

CYCLE Check of the total cycle

- You can check the total cycle which was operated so far.
- Total memory capacity is 100,000 cycle.
- 1 cycle: Full close & Full Open

PIU CHECK Check of Potentiometer (0 ~ 1000kΩ)

0 ~ 120Ω : Actuator Full Close

AUTO SCAN Actuator auto calibration

- **Start Ascn** Auto Scan “Start”
- **Stop Ascn** Auto Scan “Stop”

DEAD BAND Adjustment of Dead Band valve.

- Dead Band in an area of a signal range or band where no action occure.
- The valve is adjustement between 1% and 5% in 0,5% increment.
- The original set value is 2% when shipped.

TIME DELAY Adjustment of Time Delay valve.

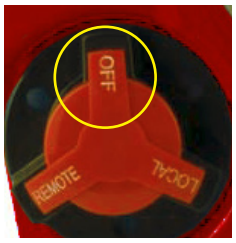
- Time Delay means that implementation of any signal is delayed when any input signal is above dead band.
- The valve is adjustment between 0,5sec and 5sec in 0,5sec increment.
- The original set value is 1,0sec when shipped.

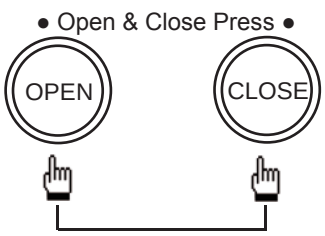
FAULT DIR Decision of behavior for input fault signal.

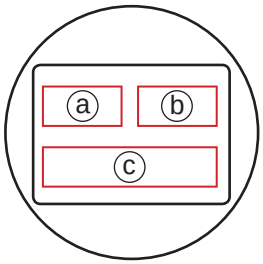
- **Fail Dir Close** Actuator “Full Close”
- **Fail Dir Open** Actuator “Full Open”
- **Fail Dir Stop** Actuator “Stop”

ESD DIR Program Reset

Setting Mode

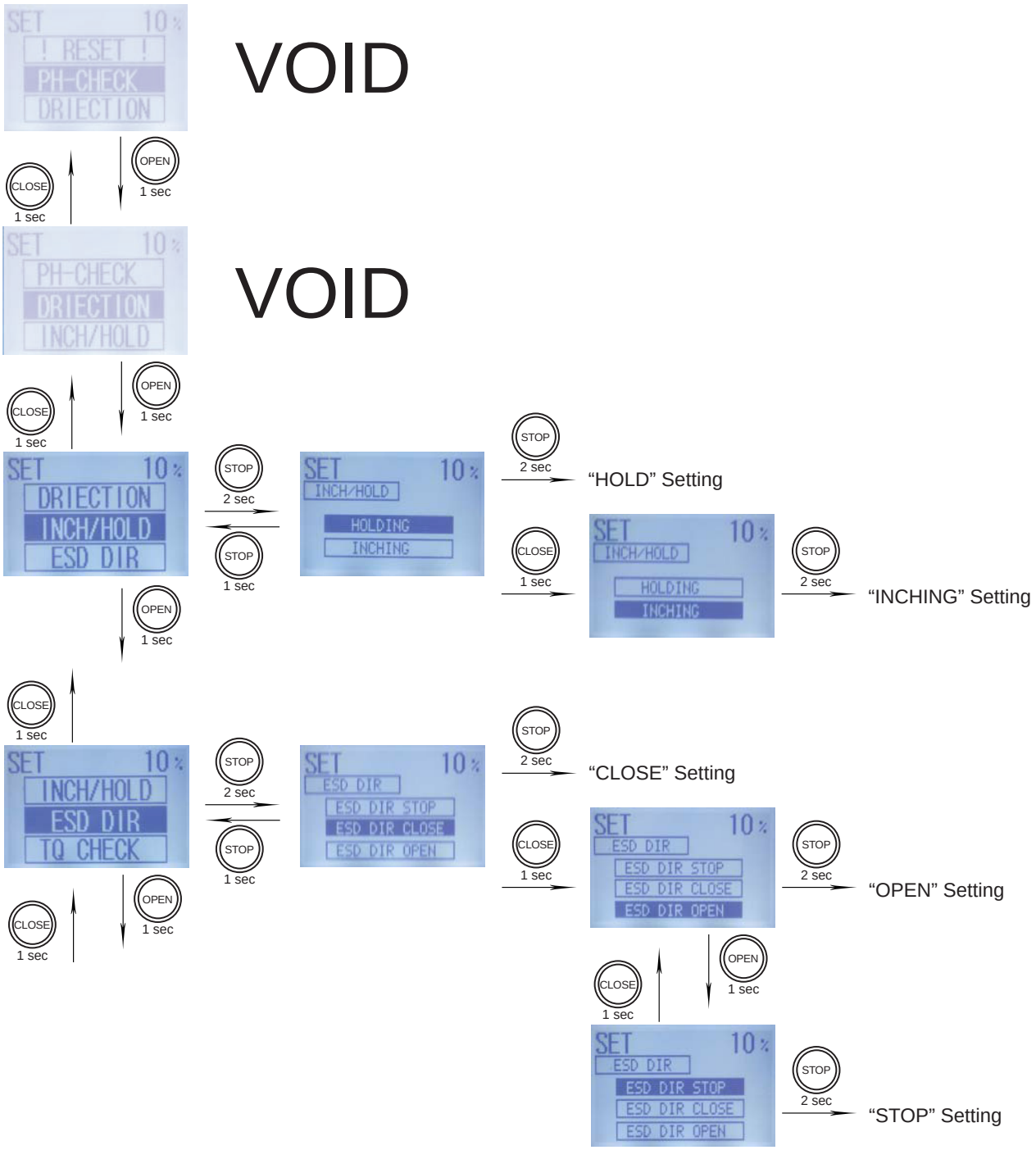


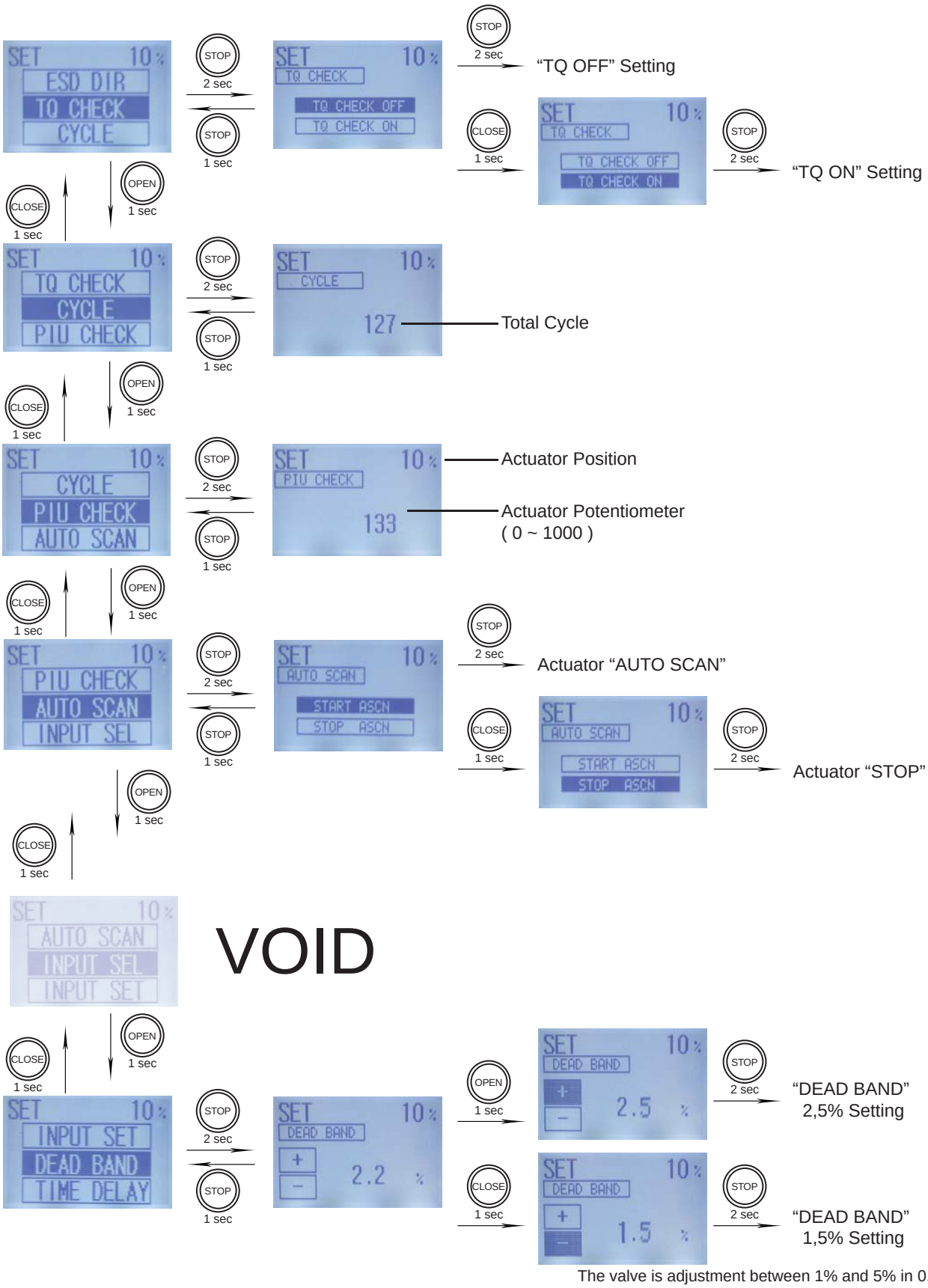




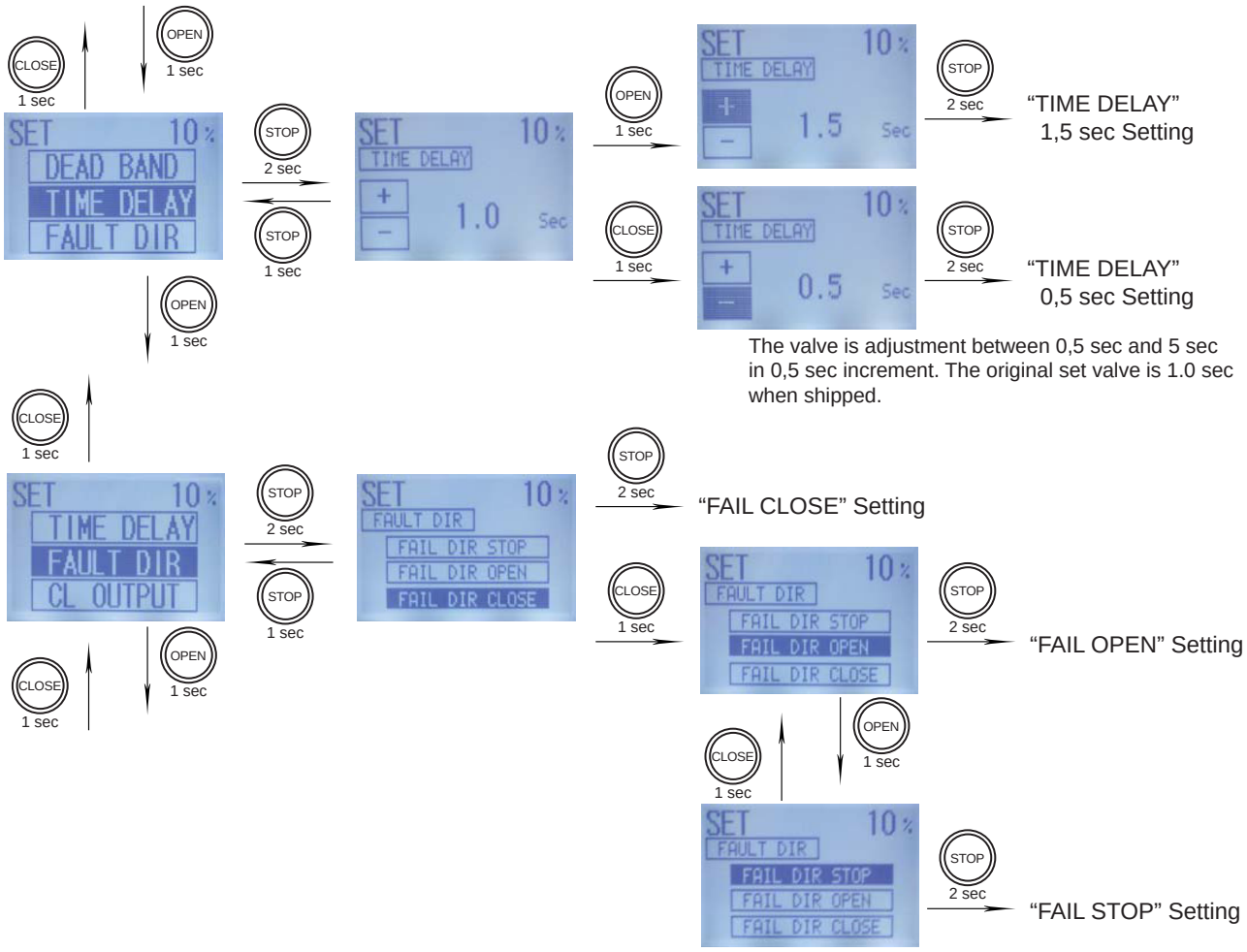
Marking	Name	Spec
a	Set	Actuator Setting
b	Position	Actuator Position Display
c	Manu	Setting Mode

Place the selector switch in “OFF” position and press the open and close button for over 2 seconds to enter the setting mode.

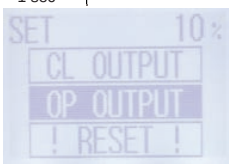




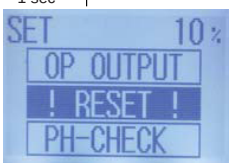
The valve is adjustment between 1% and 5% in 0,5% increment. The original set valve is 2% when shipped.



VOID

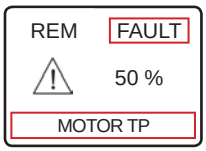
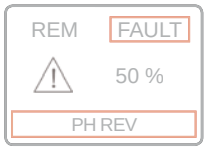
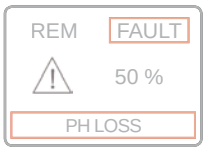
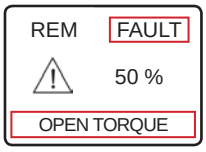
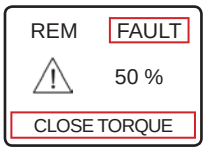
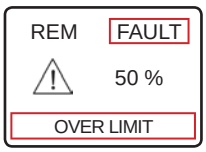
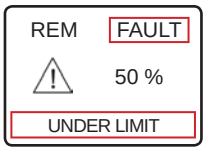
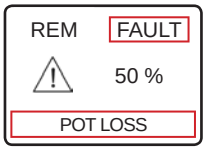
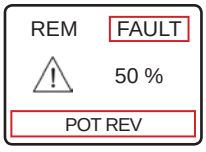
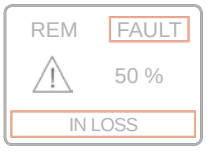


VOID



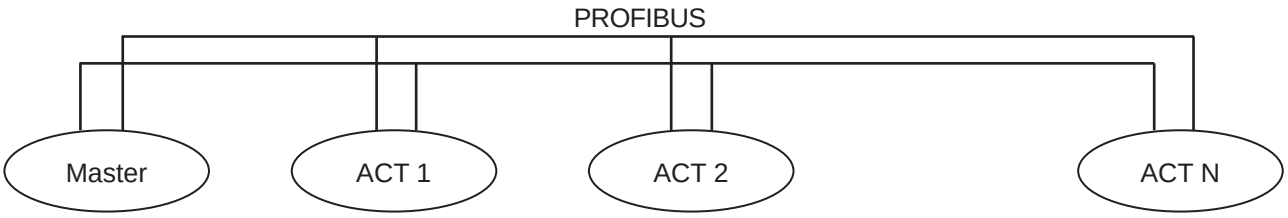
Program Reset

Self Diagnosis

Display	Message	Hove To Solve
	MOTOR TP	MOTOR OVERHEATING (150°C TP Open) Restart
	VOID	
	VOID	
	OPEN TORQUE	OPEN OVER TORQUE Restart Valve Check
	CLOSE TORQUE	CLOSE OVER TORQUE Restart Valve Check
	OVER LIMIT	OPEN LIMIT SWITCH FAILURE Open Limit Switch Resetting
	UNDER LIMIT	CLOSE LIMIT SWITCH SETTING Close Limit Switch Resetting
	POT LOSS	POTENTIOMETER LOSS After checking wiring of potentiometer
	POT REV	REVERSE POTENTIOMETER After checking wiring of potentiometer Change 2 lines in P1, P3
	VOID	

Profibus Data Format

The profibus highway uses RS485, 2 wire communication. Up to 126 devices can be connected on a signal network provided suitable repeaters are included. Without repeaters only 32 devices, including the PLC are allowed. Address 126 is reserved for a new device appearing on the highway.



BAUD RATE	MAX, Cable Length (Segment Length)	MAX, Cable Length (With Repeaters)
9,6k BAUD	1,200mm	APPROX, 10km
187,5k BAUD	1,000mm	APPROX, 10km
500k BAUD	400mm	APPROX, 4km
1,5M BAUD	200mm	APPROX, 2km

1. Control Order (Master —> Slave) : 1 byte

Index	Command				Data		
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Index	Position Data						

Table 1. Control Data Format

— Index (Bit 7): 0 - Setting operation with command and data field
1 - Modulating operation with position data field

—Setting command (Index = 0)

Bit								Description
7	Command				Data			
	6	5	4	3	2	1	0	
0	0	0	0	1	0	0	0	Phase check & make fault (Reserved)
	0	0	0	1	0	0	1	Phase check & convent (Reserved)
	0	0	1	0	0	0	0	Motor direction CW
	0	0	1	0	0	0	1	Motor direction CCW
	0	0	1	1	0	0	0	Inching mode
	0	0	1	1	0	0	1	Holding mode
	0	1	0	0	0	0	0	ESD direction STOP
	0	1	0	0	0	0	1	ESD direction CW
	0	1	0	1	0	0	0	Torque check on (Limit setting)
	0	1	0	1	0	0	1	Torque check off (Torque seating)
	0	1	1	0	0	0	0	Auto scanning stop (Not used)
	0	1	1	0	0	0	1	Auto scanning start (Not used)
	0	1	1	1	0 ~ 7			Deadband (0.1% + 0.3% *Value)
	1	0	0	0	0 ~ 7			Time delay (0.0sec + 0.5sec *Value)

—Position operating (Index = 1)

Bit Number								Description
	Position Data							
7	6	5	4	3	2	1	0	
1	0	0	0	0	0	0	0	0%
				~				~
	0	0	1	0	0	0	0	25%
				~				~
	0	0	1	1	0	0	0	50%
				~				~
	0	1	0	0	0	0	0	75%
				~				~
	0	1	0	1	0	0	0	100%
	0	1	0	1	0	0	1	STOP
	0	1	1	0	0	0	0	OPEN
	0	1	1	0	0	0	1	CLOSE
	0	1	1	1	0	0	0	ESD

2. Response Data (Master <— Slave) : 3 bytes

—1st Data (Position)

7	6	5	4	3	2	1
Position Data (0 - 255)						

Ex) Position Data 100: 100/2 → 50%

—2nd Data (Status)

Bit Number								Description
7	6	5	4	3	2	1	0	
							■	Phase check (0:OFF, 1:ON) (Reserved)
						■		Direction (0:CW, 1:CCW) (Reserved)
					■			Inch/Hold (0:Inch, 1:Hold)
				■				ESD dir (0:STOP, 1:CW)
			■					Torque check (0:ON, 1:OFF,)
		■						Monitoring (0:LOC, 1:REM)

—3rd Data (Act & Fault)

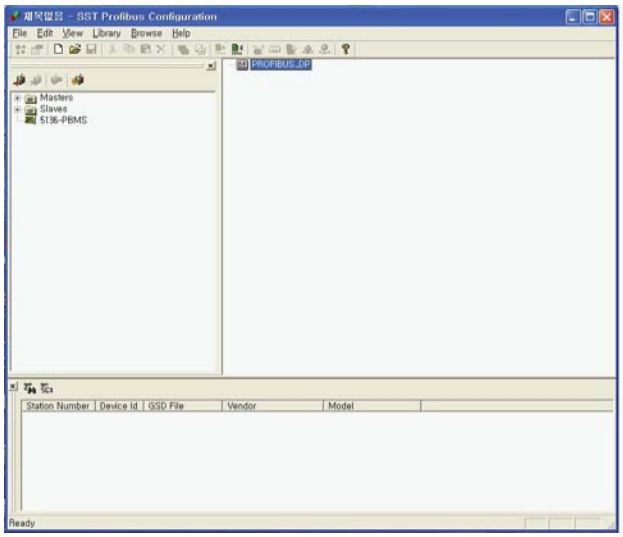
Bit Number								Description
7	6	5	4	3	2	1	0	
0	0	0	0	x				Normal Stop
	0	0	1					Opening
	0	1	0					Closing
	0	1	1					Full Open
	1	0	0					Full Close
1	x	x	1					Torque Open
	x	1	x					Torque Close
				■				Fault Phase: (0: None, 1: Fault)
					■			Lost Pot: (0: None, 1: Fault)
Reserved								
Reserved								

Profibus Setting

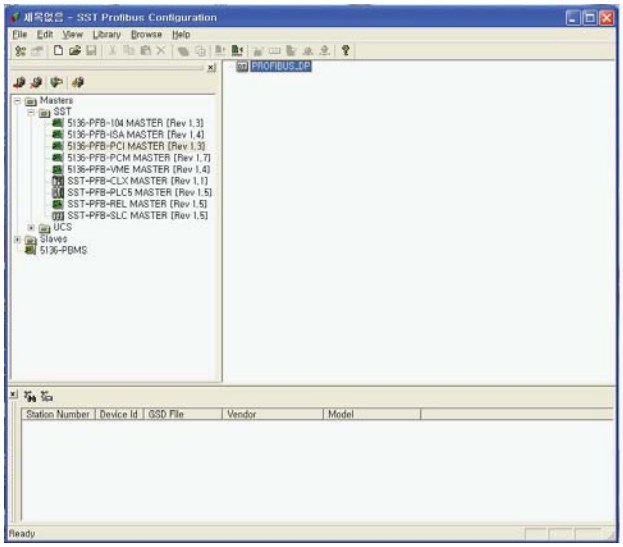
GSD FILE - MASTER: Program Install

PROFIBUS - DP SOFTWARE SETTING

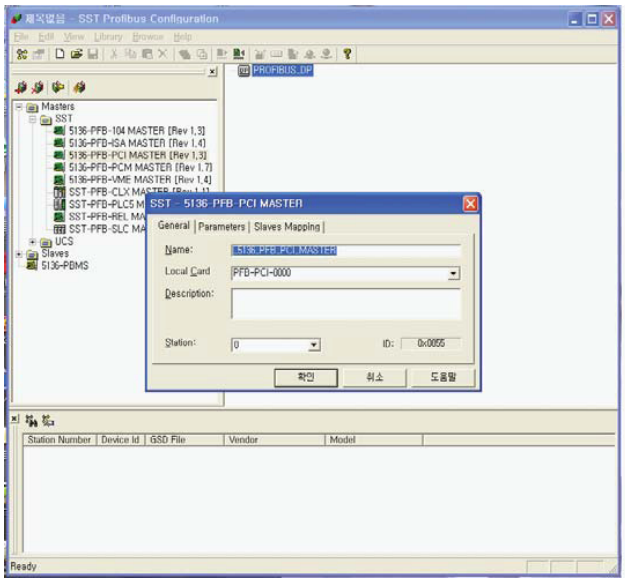
1) Configuration Tool Operation



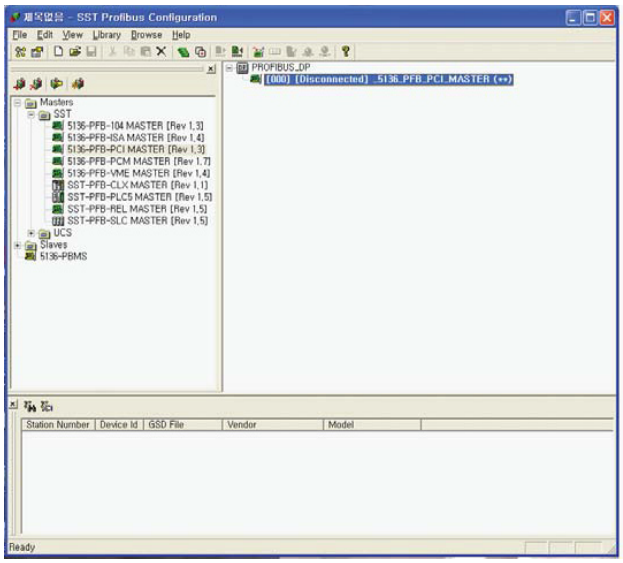
2) Master Select



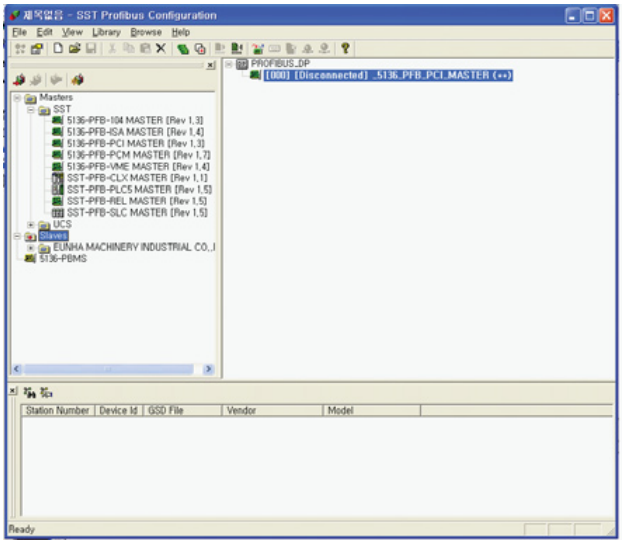
3) Master → Address Selector



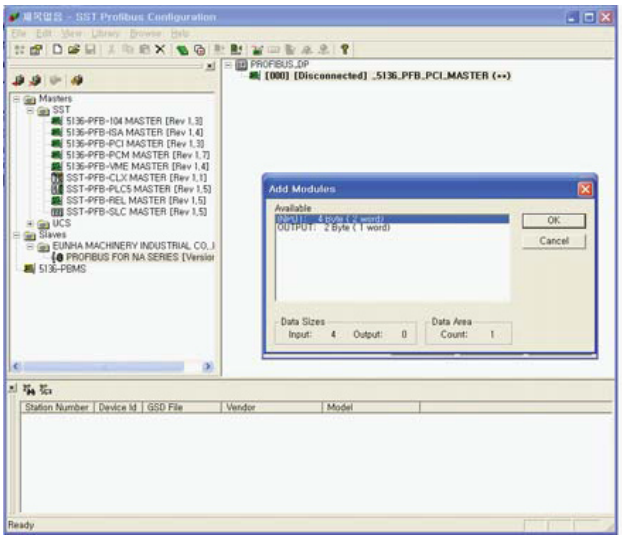
4) MASTER SETTING FINISH



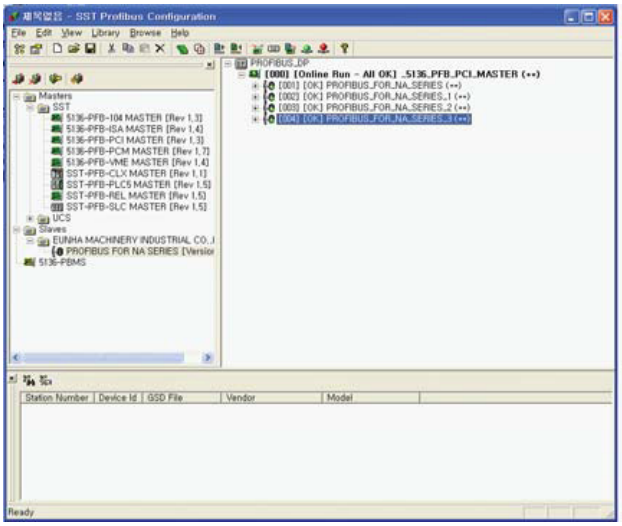
5) Slave → Actuator Gsd File Add



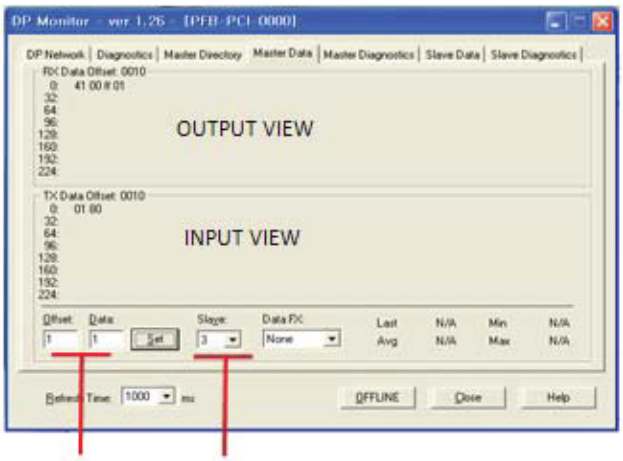
6) Address, Input Module, Output Module Setting



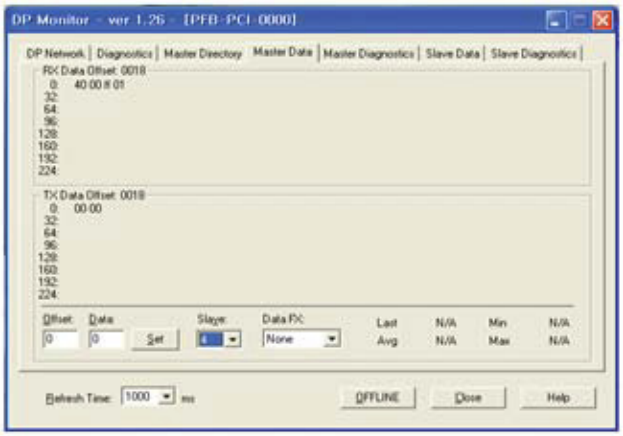
7) Configuration Attendance → On-line Operation

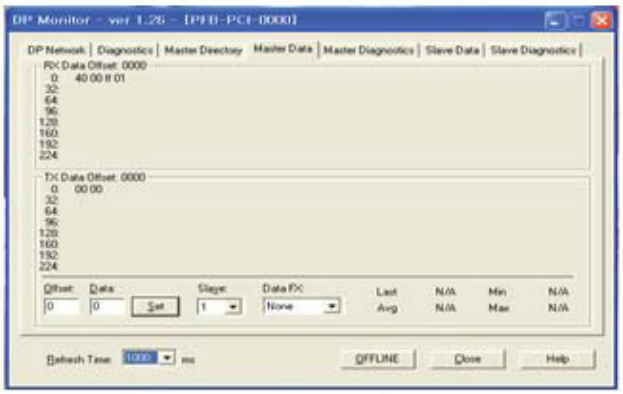


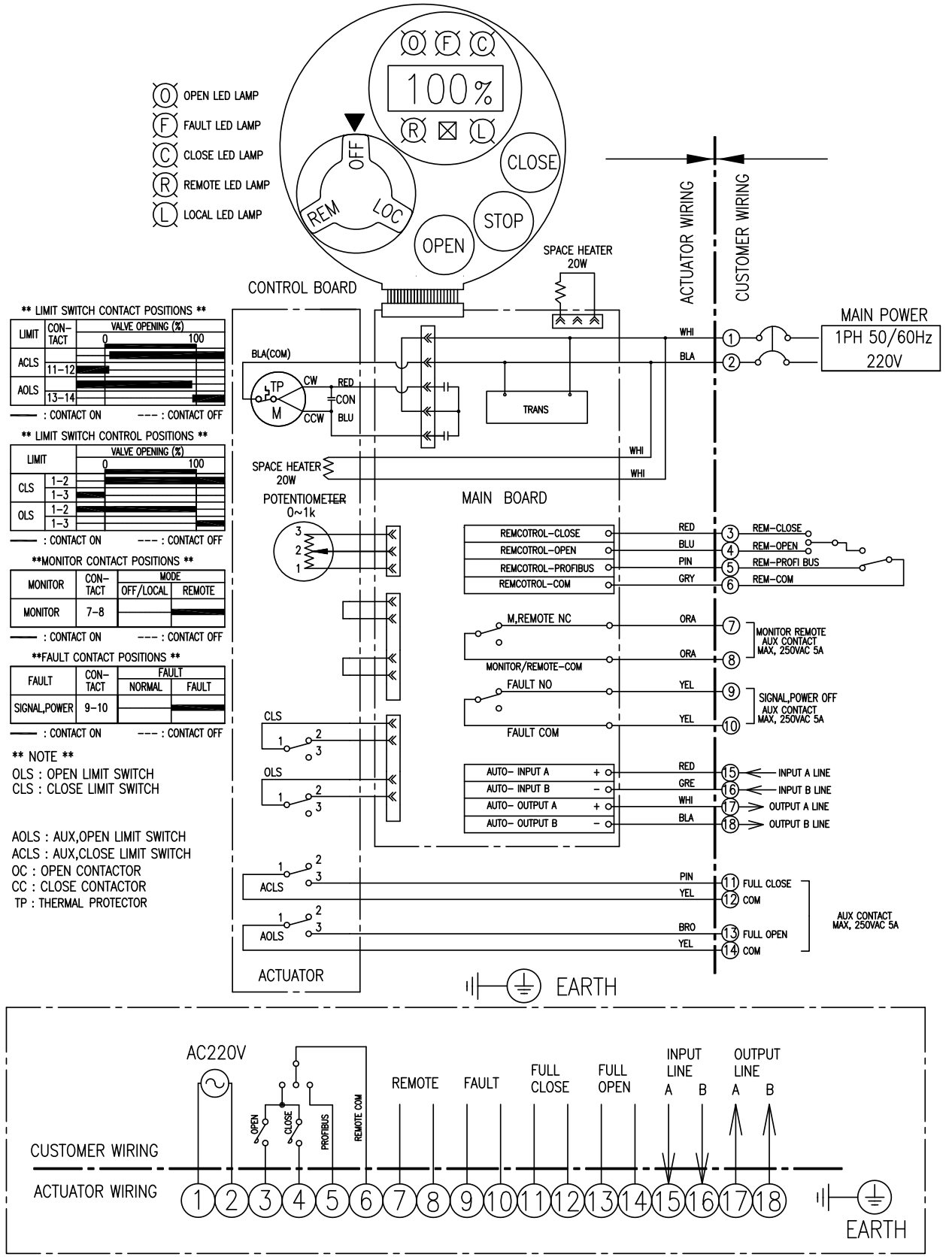
8) DATA-EXCHANGE MODE



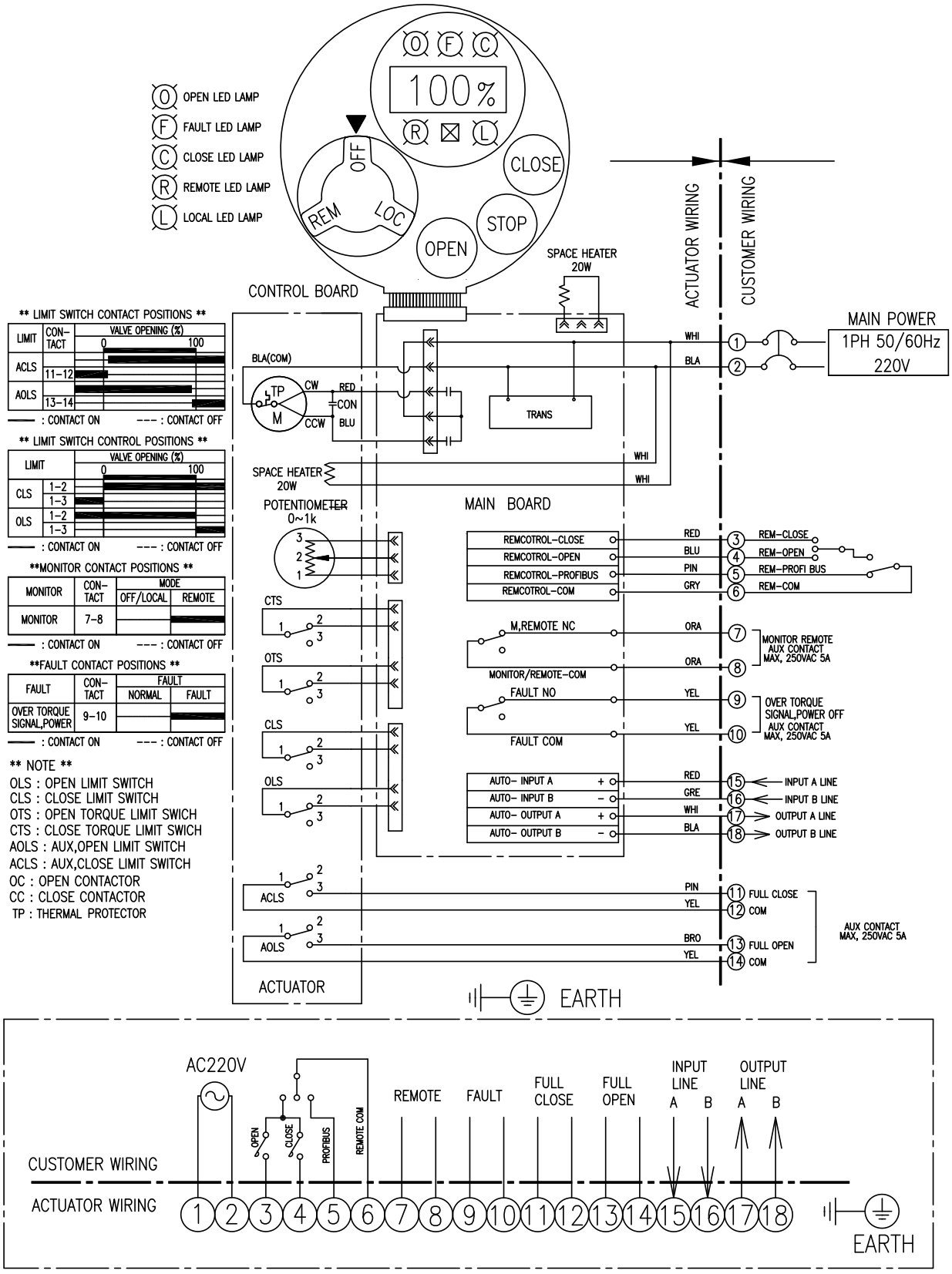
CONTROL ACTUATOR ADDRESS







Draw No. NU-2A4A-A



Draw No. NS-2A4-A

We reserve the right to make changes without notice

ROTORK SWEDEN AB
Box 80, Kontrollvägen 15, SE-791 22 Falun, Sweden
Tel: +46 (0)23-587 00 • Fax: +46 (0)23-587 45 • falun.info@rotork.com