ST400

USER GUIDE

ST 400

SBR

ENGINEERING

OPERATING INSTRUCTIONS

ST400 control unit is compatible with universal voltage range (85-305V_{AC} 50/60Hz L-N).

ST400 control unit can be used to control one single-phase 230V_{AC} motor up to 800W or one three-phase 400V_{AC} motor up to 1,5kW.

Instructions:

- Cable connections and the operating logic should be in compliance with regulations.
- The cables with different voltages should be kept detached or adequately insulated by an additional insulation of at least 1mm.
- Cables should be connected to terminals properly without exposed metal surface outside of terminals.
- Check all connections before powering the unit.
- **Normally Close (NC) inputs** which are not used should be short–circuited to **COM**.
- The power supply mains should be connected to an omni polar switch with contact opening distance minimum 3mm. Check that upstream electric system is provided with an adequate differential switch and overcurrent switch.
- Unless supervised or instructed, this device is not intended to be used by individuals with low physical, sensory or mental abilities (included children) or those lacking experience and knowledge.
- Children should be supervised to prevent them from playing with the device.
- Keep remote controls out of reach of children.
- Device is suitable for use at altitudes above 2000 meters.
- Inspect the installation for possible imbalance and signs of wear or damage in cables, springs and assembly. Do not use if repair or adjustment is necessary.
- Disconnect the power supply when cleaning or performing other maintenance.
- Installation instructions specify the type, size and mass of the driven part as well as locations where the controller unit can be mounted and whether the drive is suitable only for balanced vertically driven components.
- Before installing the controller unit, check that the driven part is properly balanced and suitable.
- After installation, make sure that the mechanism is properly adjusted.

WARNING:

Follow all instructions carefully as improper installation may result in serious injury.

WARNING:

Control unit must be disconnected from power supply during cleaning, maintenance and replacement of parts.

Can only be connected by qualified and trained electrical technicians.

Program the control unit and finish installation.

Qualified and trained electrical technicians are expected to meet the following requirements:

- Knowing and applying general and special safety and accident prevention regulations
- Knowledge of relevant electrical regulations
- Trained in the use and maintenance of appropriate safety equipment
- Recognizing electrical hazards

NOTE:

ST400 control unit does not contain substances such as Asbestos, PCB (Polychlorinated Biphenyl) and HG (Mercury) that are harmful to human health and is not used in its production.

OVERVIEW
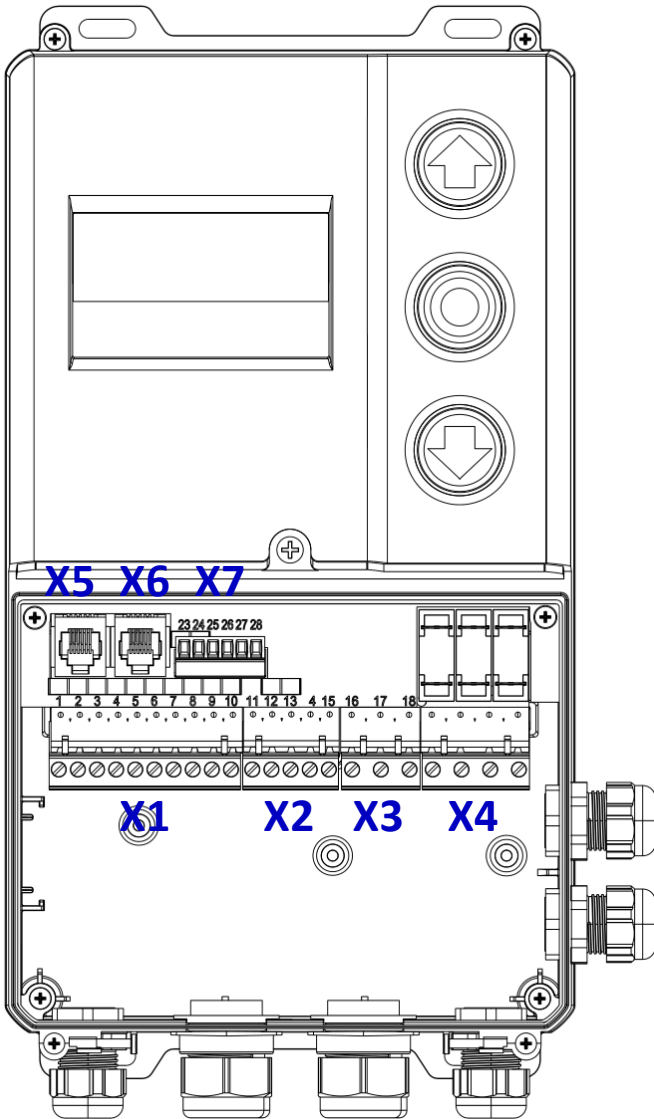
X1 – COMMAND AND SECURITY DEVICES CONNECTION TERMINAL

Pin	Function	Description
1	COM	Common connection
2	STOP	Emergency Stop connection (NC contact)
3	PHOTO	Photocell connection (NC contact)
4	START	Start button connection (NO contact)
5	OPEN	Open button connection (NO contact)
6	CLOSE	Close button connection (NO contact)
7	IN1	Programmable input 1 connection
8	IN2	Programmable input 2 connection
9	0V	24Vdc output (max. 250mA)
10	24V	

X2 – OPTOELECTRNIC SAFETY EDGE TERMINAL

Pin	Function	Description
11	12Vdc	Power supply 12Vdc for optical sensor
12	OSE/P	Safety edge signal connection
13	GND	Power supply GND for optical sensor
14	STP2	Stop input for pedestrian door connection (NC contact)
15	COM	Common connection

X3 – MOTOR CONNECTION TERMINAL

Pin	Function	Description
16	U	400VAC three-phase motor connection
17	V	
18	W	

X4 – MAINS SUPPLY TERMINAL

Pin	Function	Description
19	L1	Three-phase grid connection
20	L2	
21	L3	
22	N	Neutral

X7 – LIMIT INFORMATION TERMINAL

Pin	Function	Description
23	SWO or MANUAL	Open limit switch connection or motor manual switch (NC contact)
24	SWC or THERMIC	Close limit switch or motor thermic switch connection (NC contact)
25	A	ENC RS485A connection
26	B	ENC RS485B connection
27	GND	Power supply for ENC
28	12V+	

X5 – PROGRAMMABLE RELAY MODULE TERMINAL

X6 – RECEIVER MODULE TERMINAL

CONNECTIONS

X1 - Command and Security Devices Connection
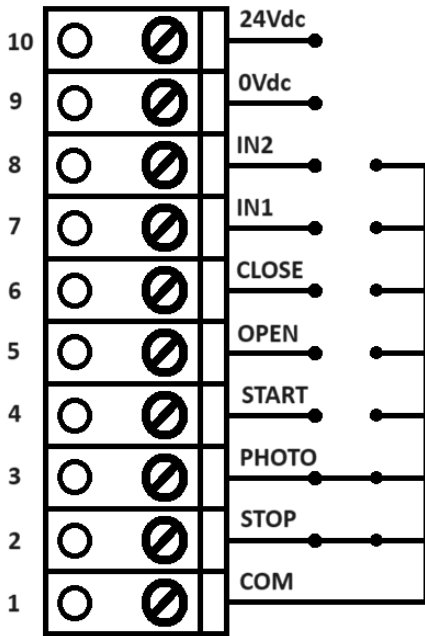
Connections of command and safety devices are shown on the left.

You can give a STOP command to the door by connecting a NC contact button to the **STOP (2)** terminal. If this input will not be used, it must be connected to **COM(12)**.

You can connect your photocell output to the **PHOTO (3)** terminal. If a photocell is not used, this input should be connected to **COM(1)**. Photocell can be powered with using **24Vdc** power supply output (terminals **9** and **10**).

You can command the door to START by connecting a button to **START(4)** terminal. By default, it operates in the OPEN-STOP-CLOSE-STOP sequence. If this input will not be used, it should be left blank.

You can command the door to OPEN by connecting a button to **OPEN(5)** terminal. If this input will not be used, it should be left blank.

You can command the door to CLOSE by connecting a button to **CLOSE(6)** terminal. If this input will not be used, it should be left blank.

IN1(7) and **IN2(8)** terminals are programmable using programing menu. For options, see programming menu.

X2 - Optoelectronic Safety Edge Connection
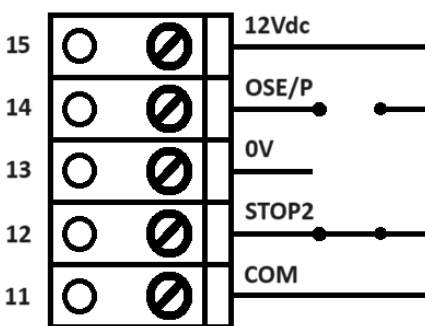
STOP2(12) can be programmed as either HALF-OPEN or PEDESTRIAN door switch (default). If this input will not be used, it should be connected to **COM(11)**.

If pneumatic is to be connected to the door, it must be connected to the **OSE/P(14)** terminal. This input can be used as NO or NC. If not used, it must be connected to **+12V (15)** terminal.
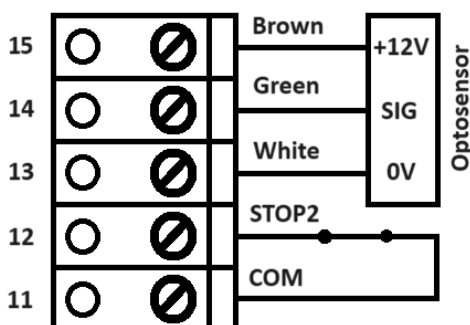
If an optosensor will be connected to the door, **+12V(15)** and **GND (13)** terminals should be used for the supply voltage of the sensor. The sensor output must be connected **OSE/P (14)** terminal. This input programmed to respond to signals at a frequency of 100kHz.
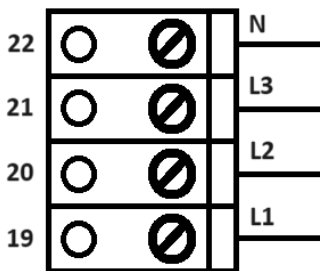
To program the entry, see menu 503.

X3 - Motor Connection
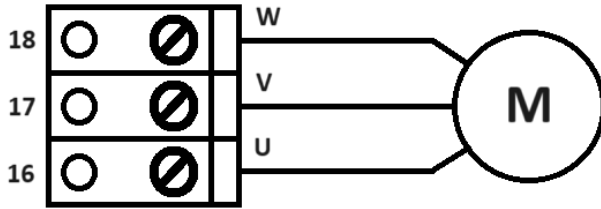
Connect three-phase motor to the **U(16)**, **V(17)** and **W(18)** terminals shown in the figure.

X4 - Mains Supply Connection

Make the power connection of the control unit from **L1(19)**, **L2(20)**, **L3 (21)** and **N(22)** terminals as shown in the figure.
Mains supply input is compatible with:
3N~208VAC-50/60Hz
3N~240VAC-50/60Hz
3N~400VAC-50/60Hz

X5 - Programmable Relay Module Connection

SBR Engineering programmable relay module can be connected this terminal. Our relay module includes three-way traffic light control and three independent programmable relay outputs. Those outputs can be programmed as flasher, door opened, door closed, buzzer etc. output from *INPUT -OUTPUT* ADJUSTMENTS menu.

X6 - Receiver Module Connection

SBR Engineering remote receiver module can be connected to this connection.

X7 - Limit Information Connection
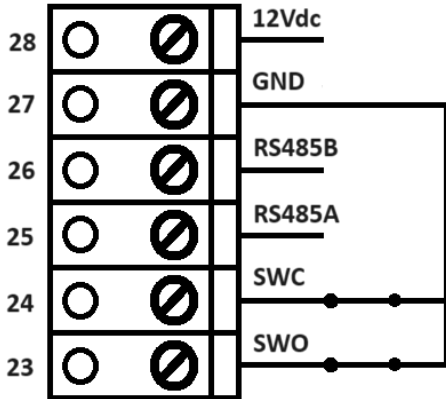
As shown in the figure that is on the left, this terminal can be used for both **ENC (Electronical limit switch)** and **MEC (Mechanical limit switch)**. Connections as follows;

12Vdc(28) and **GND(27)** should be used to power **ENC**. If **MEC** is used, **GND(27)** is common connection.

RS485B(26) is connected to **Modbus-B** connection of **ENC**. If **MEC** is used, it should be left blank.

RS485A(25) is connected to **Modbus-A** connection of **ENC**. If **MEC** is used, it should be left blank.

SWC(24) is door closed switch connection. If **ENC** is used, it should be connected to **motor manual switch** connection.

SWO(23) is door opened switch connection. If **ENC** is used, it should be connected to **motor thermic switch** connection.

Unused terminals must be connected to **COM(8)** terminal.

NOTE: *Cables which are suitable for door drive comes pre connected in the door drive box. Unplug this terminal from control unit and plug relevant end of the cable to this terminal.*

Programming with LCD Information Display

Various functions of the control unit can be programmed using LCD information screen located on the front of the unit and setting the necessary parameters in the programming menu as described below.

PARAMETERS ADJUSTMENT MENU, allows editing values of relevant functions.

LOJIC ADJUSTMENT MENU, allows to turn on-off relevant functions.

Special functions follow *PARAMETERS ADJUSTMENT MENU* or *LOJIC ADJUSTMENT MENU* and may vary depending on the type of controller or software version.

Access to the Programming Menu:
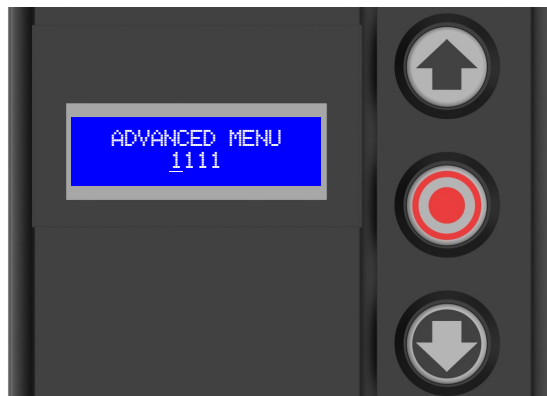
1. Press and hold **UP** and **STOP** buttons at the same time, password screen will appear on the screen.
2. To enter the password, use **UP** and **DOWN** buttons. For changing position of cursor, use **STOP** button. (Default password is 1453)
3. **Navigate to desired menu using UP, DOWN and STOP buttons.**

Note: *After a 60-second waiting period, control unit exits programming mode and programming menu will disappear.*

1-PARAMETERS ADJUSTMENT

Display	Description
100AUTO. CLOSING TIME: 40 SEC	Automatic close time. After countdown, control unit closes door.
101.MAX. OPEN TIME: 30 SEC	Maximum opening time. This parameter restricts maximum elapsed time on opening direction.
102.MAX. CLOSE TIME: 30 SEC	Maximum closing time. This parameter limits maximum elapsed time on closing direction.
103.FOREWARN.OPN TIME: 2 SEC	Before the door starts to move upwards, if the pre-warning mode is activated flasher will be on for pre-warning period.
104.FOREWARN.CLS TIME: 5 SEC	Before the door starts to move downwards, if the pre-warning mode is activated flasher will be on for pre-warning period.
105.FAST CLOSE TIME: 5 SEC	Fast close time. After the door opened, photocell detects passage and changes automatic closing time to set value. İt must be activated from logic menü.
106.TURNAROUND TIME: 200MS	Waiting time at the change of direction.
107.MAX CURRENT 4.0AMP	Motor overcurrent protection value.
110.PART.OPENING TIME: 5 SEC	Half-opening time.

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       2-LOJIC
     ADJUSTMENT
```

```200.AUTO.CLOSING``` ```OFF```	Parameter to set automatic shutdown mode enable/disable
```201.BLOCK PULSES``` ```OFF```	Sets whether the START (Step-by-Step) signal or CLOSE button signal will be effective or not during opening phase.
```202.FAST CLOSE``` ```OFF```	Enable/disable status setting for quick shutdown mode.
```203.WORKING MODE``` ```OP.AUTO/CLS.AUTO```	1.Open Auto/Close Auto 2.Open Auto/Close Manual 3.Open Manual/Close Manual
```204. 3 / 4 STEP``` ```OP/STOP/CLS/STOP```	1.Open/Stop/Close/Stop 2.Open/Stop/Close/Open
```205.PRE-ALARM``` ```OFF```	Enable/disable status setting for pre-warning mode. *Only effective with Relay Module and one of the relays should be set to flasher mode.
```206.SPRING COUNT``` ```OFF```	Spring life counter enable/disable setting.
```207.GATE-CYCLE``` ```OFF```	Service warning counter enable/disable setting.
```208.SERVICE MODE``` ```OFF```	Service mode enable/disable setting.
```209.MENU PASSWRD``` ```ON```	Menu password enable/disable setting.
```210.PHASE DETECT``` ```ON```	Phase control enable/disable setting.
```211.OVER CURRENT``` ```ON```	Overcurrent protection enable/disable setting.

3– END POSITION ADJUSTMENT

| 300.OPEN ENDPOS. 5000 | Click **OK** button to set open limit position. |

| 300.OPEN ENDPOS. 5000   4000 | Press **OPEN** button to set opened position and press **OK** button to save. |

Set Value   Actual Value

| 301.CLOSE ENDPOS 3000 | Click **OK** button to set close limit position. |

| 301.CLOSE ENDPOS 3000   4000 | Press **CLOSE** button to set closed position and press **OK** button to save. |

Set Value   Actual Value

| 302.FINE ADJ.OPEN | Calibration value for open limit. |

| 303.FINE ADJ.CLOS | Calibration value for close limit. |

| 304.ABSL.ENCODER OFF | Absolute encoder ON/OFF setting. |

| 305.REVERSE OFF VALUE: 150 | Cancellation position of safety edge systems for closing direction (distance value from close limit value). |

| 306.ROTATINGFIELD MOD 1: STRAIGTH | Mod 1: Straight
Mod 2: Reverse |

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4-DOOR WORKING
   INFORMATION
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Display	Description
`400.TOTAL CYCLE` `COUNT:        0`	Total cycle counter.
`401.SERVICE WARN` `COUNT:    20000`	Service warning value for cycle counter.
`402.SPRING WARN.` `COUNT:    20000`	Spring warning value for cycle counter.
`403.PRODUC. DATE` `   21.11.2018`	Production date.
`404.MOUNT. DATE` `   09.01.2019`	Installation date.
`405.S.NO & VER.` `  XXXXXXXX VX.X`	Product serial number and software version.

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5-INPUT-OUTPUT
   ADJUSTMENTS
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`500.INPUT10 SWC` `        ON`	Menu for setting closed limit switch input ON/OFF.
`501.INPUT11 SWO` `        ON`	Menu for setting opened limit switch input ON/OFF
`502.INPUT 12 OSE` `2.PNEUMATIC NC`	1.Optosensor 2.Pneumatic NC 3.Pneumatic NO
`503.INPUT 7 IN1` `PED. DOOR SWITCH`	1.Pedestrian door switch 2.pedestrian open
`504.INPUT 8 IN2` `PEDESTRIAN OPEN`	1.Pedestrian door switch 2.pedestrian open
`505.FUNCTION` `RELAY SETTINGS`	Settings menu for relay module function relays.

`505.RELAY 1` `3.ERROR`	1.Flasher 2.Buzzer 3.Error	4.Opening 5.Closing 6.Opened	7.Closed 8.Opened+Closed 9.Opening+Opened	10.Closing+Closed 11.Opening+Closed 12.Closing+Opened
`505.ROLE 2` `6.OPENED`	1.Flasher 2.Buzzer 3.Error	4.Opening 5.Closing 6.Opened	7.Closed 8.Opened+Closed 9.Opening+Opened	10.Closing+Closed 11.Opening+Closed 12.Closing+Opened
`505.ROLE 3` `7.CLOSED`	1.Flasher 2.Buzzer 3.Error	4.Opening 5.Closing 6.Opened	7.Closed 8.Opened+Closed 9.Opening+Opened	10.Closing+Closed 11.Opening+Closed 12.Closing+Opened

`506.FACTORY DEF.` `2.END.ENCODER`	1.Endust.M.SW. 2.End.Encoder 3.H.PVC M.Switch 4. H.PVC Encoder 5.Factory Reset

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6-LCD ADJUSTMENTS
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`600-LANGUAGE` `1.TURKISH`	Language selection menu. 1.Turkish 2.English
`601.MENU PASSWRD`	Password change menu.
`602EROOR HISTORY`	Error history menu.

FAULT MESSAGES

EP500A POWER ERROR	Phase sequence is incorrect. Check phase sequence or fuses.
EP500A MOT. POWER ERROR	Check motor connection cables or motor.
EP500A EMERGENCY STOP1	Check emergency stop button or emergency button cables.
EP500A EMERGENCY STOP3	Check motor temperature, it I caused due to thermic switch or manual emergency operator.
EP500A ENCODER ERROR	Electronic limit switch communication error. Check ENC connection.
EP500A PED. DOOR OPEN	Check connection of STOP2 input.
EP500A MOTOR DIR.ERROR	Motor direction error. Change two cables of motor.

SBR ENGINEERING

Address:

Fevziçakmak Mah. Sıla Cad.

48-O, Elit Sanayi Sitesi,

Karatay / KONYA

Phone : +90 850 533 1727

Fax : +90 332 238 4182

Mail : info@sbr.com.tr

Web : www.sbr.com.tr