# Smart Relay

## SRW 01

### Addendum to User Manual V1.3X

Language: English
Document: 10000590245 / 00

# Addendum to User Manual V1.3X

Series: SRW 01

Language: English

Document Number: 10000590245 / 00

Firmware Version: V2.0X

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# SUMMARY

# 1 INTRODUCTION

This ADDENDUM describes the changes present on the new software version for the SRW 01 Smart Relay.
It complements manual 0899.5838 P/03 version 1.3X that accompanies the product with the new 2.0X version incorporated.

The 2.0X software version of the SRW 01 Smart Relay has some differences in the operation in relation to the previous 1.3X version:

- New hardware and inclusion of new parameters for Earth Leakage protection using an external sensor (ELS) connected to terminals S1 and S2 of the Control Unit.
- A new way of driving using digital inputs. It is possible to select the local control with three wires (pushbutton) or with two wires (switch). The OFF control logic for three wires (pushbutton) can be changed from active on level 0, normally closed (NC) to active on level 1, normally open (NO), using parameter P231.
- Inclusion of six Programmable Reading Parameters. On the Modbus –RTU communication mode it can read six parameters sequentially and detection the Timeout on serial communication.
- Inclusion of digital output status on the Status Word #1 (P729).
- External Fault protection through the input signal on the selected digital input.
- Inclusion of new functions for digital outputs O1 to O4 which can signal Alarm/Fault (NO) or Trip/Error (NO or NC).

The changes are described below.

# 2 QUICK REFERENCE OF THE PARAMETERS

The parameters highlighted in blue are only available for the version of the Control Unit identified by: SRW01-UCxTxE47 now called SRW01-PTC. The parameters in grey are only available for version SRW01-UCxExE47, called SRW01-RCD. The parameters in white are of common use among the versions with PTC and Earth Leakage protection.

For further information about product identification, consult item 3.3 of this addendum or the catalog provided in electronic format on the CD-ROM that accompanies the product or access the WEG site - www.weg.net.

| Parameter | Description | Adjustable Range | Factory Setting | User Setting | Proprieties |
|---|---|---|---|---|---|
| **P000** | Access to the Parameters | 0 to 999 | 0 | | rw |
| **P001** | Scan Cycle Time | 0.0 to 6553.5 ms | - | | RO |
| **P002** | IN % Current | 0 to 250 % | - | | RO |
| **P003** | TRUE RMS Current | 0.0 to 999.9 A | - | | RO |
| **P005** | Line Frequency | 0.0 to 99.9 Hz | - | | RO |
| **P006** | Relay Status (binary) | bit0 = Error<br>bit1 = TRIP<br>bit2 = Alarm/Fault<br>bit3 = Motor On<br>bit4 = Remote Mode | - | | RO |
| **P012** | Digital Inputs I1 to I4 Status (binary) | bit0 = I1<br>bit1 = I2<br>bit2 = I3<br>bit3 = I4 | - | | RO |
| **P013** | Digital Outputs O1 to O4 Status (binary) | bit0 = O1<br>bit1 = O2<br>bit2 = O3<br>bit3 = O4 | - | | RO |
| **P014** | Last Error | 0 to 100 | - | | RO |
| **P015** | Second Error | 0 to 100 | - | | RO |
| **P016** | Current Error | 0 to 100 | - | | RO |
| **P020** | PTC Value (ohms) | 0 to 10000 Ω | - | | RO |
| **P023** | Firmware Version | 0.00 to 655.35 | - | | RO |
| **P030** | R Phase TRUE RMS Current | 0.0 to 999.9 A | - | | RO |
| **P031** | S Phase TRUE RMS Current | 0.0 to 999.9 A | - | | RO |
| **P032** | T Phase TRUE RMS Current | 0.0 to 999.9 A | - | | RO |
| **P036** | Earth Leakage Percentage Current | 0 to 3334 % | - | | RO |
| **P037** | Earth Leakage TRUE RMS Current | 0.000 to 10.000 A | - | | RO |
| **P042** | Powered Relay Time | 0 to 65530 h | - | | RO |
| **P043** | Motor Running Time | 0 to 65530 h | - | | RO |
| **P050** | Motor Thermal Protection | 0 to 250 % | - | | RO |
| **P051** | Current Imbalance Level | 0 to 100 % | - | | RO |
| **P052** | Earth Fault Level | 0 to 200 % | - | | RO |
| **P060** | Number of Starts | 0 to 65535 | - | | RO |
| **P061** | Number of Overload Trips | 0 to 65535 | - | | RO |
| **P062** | Number of Current Imbalance Trips | 0 to 65535 | - | | RO |
| **P063** | Number of Earth Fault Trips | 0 to 65535 | - | | RO |
| **P064** | Number of Phase Loss Trips | 0 to 65535 | - | | RO |
| **P065** | Number of Overcurrent Trips | 0 to 65535 | - | | RO |
| **P066** | Number of Undercurrent Trips | 0 to 65535 | - | | RO |
| **P067** | Number of Frequency Out of Range Trips | 0 to 65535 | - | | RO |
| **P068** | Number of PTC Trips | 0 to 65535 | - | | RO |
| **P069** | Number of Earth Leakage Trips | 0 to 65535 | - | | RO |

| Parameter | Description | Adjustable Range | Factory Setting | User Setting | Proprieties |
|---|---|---|---|---|---|
| **P070** | Number of External Fault Trips | 0 to 65535 | - | | RO |
| **P071** | TRIP Status 1 (binary) | bit0 = PTC<br>bit1 = Out of Frequency<br>bit2 = Undercurrent<br>bit3 = Overcurrent | - | | RO |
| **P072** | TRIP Status 2 (binary) | bit0 = Phase Loss<br>bit1 = Current Imbalance<br>bit2 = Earth Fault<br>bit3 = Overload | - | | RO |
| **P073** | TRIP Status 3 (binary) | bit0 = Earth Leakage<br>bit1 = External Fault<br>bit2 = Trip Test<br>bit3 = No Function | - | | RO |
| **P075** | Alarm Status 1 (binary) | bit0 = PTC<br>bit1 = Out of Frequency<br>bit2 = Undercurrent<br>bit3 = Overcurrent | - | | RO |
| **P076** | Alarm Status 2 (binary) | bit0 = Phase Loss<br>bit1 = Current Imbalance<br>bit2 = Earth Fault<br>bit3 = Overload | - | | RO |
| **P077** | Alarm Status 3 (binary) | bit0 = Earth Leakage<br>bit1 = External Fault<br>bit2 = No Function<br>bit3 = No Function | - | | RO |
| **P080** | General Trip Status | 0 to 65535 | - | | RO |
| **P081** | General Alarm Status | 0 to 65535 | - | | RO |
| **P084** | Communication Module Type | 0 = None<br>1 = Modbus-RTU<br>2 = DeviceNet<br>3 = Profibus DP | - | | RO |
| **P085** | Type of Digital Inputs | 0 = Invalid<br>1 = Invalid<br>2 = 24 Vdc<br>3 = 110 Vac | - | | RO |
| **P163** | User Program Disabling | 0 = Executes User Program<br>1 = Stops User Program | 0 = Executes User Program | | Sys, rw |
| **P200** | Password Status | 0 = Inactive<br>1 = Active<br>2 = Change Password | 1 = Active | | Sys, rw |
| **P202** | Operation Mode | 0 = Transparent<br>1 = Overload Relay<br>2 = Direct Starter<br>3 = Reversing Starter<br>4 = Star/Delta<br>5 = Dahlander<br>6 = Pole Changing<br>7 = PLC | 1 = Overload Relay | | Sys, CFG |
| **P204** | Counter Reset / Factory Settings | 0 = No Function<br>1 = Reset of the Motor Running Time<br>2 = It resets the Protection counters and the Number of Starts counter<br>3 = No Function<br>4 = No Function<br>5 = Reset to the Factory Settings | 0 = No Function | | Sys, rw |

| Parameter | Description | Adjustable Range | Factory Setting | User Setting | Proprieties |
|---|---|---|---|---|---|
| **P205** | Reading Parameter Selection | 1 = P002 (% IN Current)<br>2 = P003 (TRUE RMS Current)<br>3 = P005 (Line Frequency)<br>4 = P006 (Relay Status (binary)) | 2 = P003 (TRUE RMS Current) | | Sys, rw |
| **P208** | Check Back Type | 0 = Motor Current<br>1 = Digital Input Ix<br>2 = Simulation | 0 = Motor Current | | Sys, CFG |
| **P209** | Execution Time | 100 to 2000 ms | 200 ms | | Sys, CFG |
| **P210** | Star/Delta Time | 1 to 99 s | 25 s | | Sys, CFG |
| **P211** | Check Back Time | 0 to 2000 ms | 200 ms | | Sys, CFG |
| **P212** | Motor Transition Time | 50 to 5000 ms | 50 ms | | Sys, CFG |
| **P220** | Local/Remote Selection | 0 = Always Local<br>1 = Always Remote<br>2 = HMI key (LOC)<br>3 = HMI key (REM)<br>4 = Digital Input I3<br>5 = Digital Input I4<br>6 = Fieldbus (LOC)<br>7 = Fieldbus (REM)<br>8 = USB/Ladder | 2 = HMI key (LOC) | | Sys, rw |
| **P229** | Local command Selection | 0 = Ix<br>1 = HMI<br>2 = USB/Ladder | 0 = Ix | | Sys, rw |
| **P230** | Local Command (Ix) Two or Three wires | 0 = Two wires (Switch)<br>1 = Three wires (Pushbutton) | 1 = Three wires (Pushbutton) | | Sys, CFG |
| **P231** | Logic Stop Command Local Mode (Ix) Three wires | 0 = Digital Input I1 (NC)<br>1 = Digital Input I1 (NO) | 0 = Digital Input I1 (NC) | | Sys, CFG |
| **P277** | Digital Output O1 Function | 0 = Internal Use (P202)<br>1 = Ladder<br>2 = Fieldbus<br>3 = Alarm/Fault Signal (NO)<br>4 = Trip/Error Signal (NO)<br>5 = Trip/Error Signal (NC) | 1 = Ladder | | Sys, CFG |
| **P278** | Digital Output O2 Function | 0 = Internal Use (P202)<br>1 = Ladder<br>2 = Fieldbus<br>3 = Alarm/Fault Signal (NO)<br>4 = Trip/Error Signal (NO)<br>5 = Trip/Error Signal (NC) | 1 = Ladder | | Sys, CFG |
| **P279** | Digital Output O3 Function | 0 = Internal Use (P202)<br>1 = Ladder<br>2 = Fieldbus<br>3 = Alarm/Fault Signal (NO)<br>4 = Trip/Error Signal (NO)<br>5 = Trip/Error Signal (NC) | 1 = Ladder | | Sys, CFG |

| Parameter | Description | Adjustable Range | Factory Setting | User Setting | Proprieties |
|---|---|---|---|---|---|
| **P280** | Digital Output O4 Function | 0 = Internal Use (P202)<br>1 = Ladder<br>2 = Fieldbus<br>3 = Alarm/Fault Signal (NO)<br>4 = Trip/Error Signal (NO)<br>5 = Trip/Error Signal (NC) | 1 = Ladder | | Sys, CFG |
| **P295** | Current Measurement Unit (UMC) | 0 = UMC0 (0.25 – 2.5 A)<br>1 = UMC1 (0.5 - 5 A)<br>2 = UMC2 (1.25 - 12.5 A)<br>3 = UMC3 (2.5 – 25 A)<br>4 = UMC4 (12.5 - 125 A)<br>5 = UMC5 (42 – 420 A)<br>6 = UMC6 (84 – 840 A) | 1 = UMC1 (0.5 - 5 A) | | Sys, CFG |
| **P297** | Motor Type | 0 = Three-phase<br>1 = Single-phase | 0 = Three-phase | | Sys, CFG |
| **P313** | Action in Case of Communication Error | 0 = Only fault indication<br>1 = The motor is turned off<br>2 = The motor is turned off and the commands are reset<br>3 = It changes to Local | 0 = Only fault indication | | Sys, rw |
| **P314** | Serial Watchdog | 0.0 to 999.0 s | 0.0 s | | Sys, CFG |
| **P400** | Motor Nominal Voltage | 0 to 999 V | 380 V | | Sys, CFG |
| **P401** | Motor Nominal Current 1 | 0.0 to 840.0 A | 0.5 A | | Sys, CFG |
| **P402** | Motor Nominal Current 2 | 0.0 to 840.0 A | 0.5 A | | Sys, CFG |
| **P406** | Service Factor | 1.00 to 1.50 | 1.15 | | Sys, rw |
| **P407** | Line Frequency | 0 to 99 Hz | 60 Hz | | Sys, rw |
| **P500** | Parameter Upload/Download | 0 = No Function<br>1 = Save Bank 1<br>2 = Save Bank 2<br>3 = Save Bank 3<br>4 = Load Bank 1<br>5 = Load Bank 2<br>6 = Load Bank 3 | 0 = No Function | | Sys, rw |
| **P501** | User Program Upload/Download | 0 = No Function<br>1 = Save Applicative 1<br>2 = Save Applicative 2<br>3 = Save Applicative 3<br>4 = Load Applicative 1<br>5 = Load Applicative 2<br>6 = Load Applicative 3 | 0 = No Function | | Sys, rw |
| **P601** | Reset Selection | 0 = Without Local Reset<br>1 = Front Button<br>2 = RESET key (HMI)<br>3 = Digital Input I3<br>4 = Digital Input I4 | 1 = Front Button | | Sys, rw |
| **P602** | Function Test/Reset Button | 0 = Disabled<br>1 = Enabled | 1 | | Sys, rw |

| Parameter | Description | Adjustable Range | Factory Setting | User Setting | Proprieties |
|---|---|---|---|---|---|
| **P609** | External Fault Time | 0 = Disabled<br>1 a 99 s = Enabled | 0 s | | Sys, rw |
| **P610** | External Fault Monitoring of protection | 0 = Always<br>1 = Only when the motor is running | 0 = Always | | Sys, rw |
| **P611** | External Fault Signal | 0 = Digital Input I1<br>1 = Digital Input I2<br>2 = Digital Input I3<br>3 = Digital Input I4 | 3 = Digital Input I4 | | Sys, rw |
| **P612** | External Fault Signal Logic | 0 = Digital Input NC<br>1 = Digital Input NO | 1 = Digital Input NO | | Sys, rw |
| **P613** | External Fault Protection Action | 0 = Alarm<br>1 = Switch off (TRIP) | 1 = Switch off (TRIP) | | Sys, rw |
| **P614** | Current Imbalance | 5 to 100 % | 40 % | | Sys, rw |
| **P615** | Current Imbalance Time | 0 = Disabled<br>1 to 99 s = Enabled | 3 s | | Sys, rw |
| **P616** | Current Imbalance Protection Action | 0 = Alarm<br>1 = Switch off (TRIP) | 1 = Switch off (TRIP) | | Sys, rw |
| **P617** | Earth Fault | 40 to 100 % | 50 % | | Sys, rw |
| **P618** | Earth Fault Time | 0 = Disabled<br>1 to 99 s = Enabled | 3 s | | Sys, rw |
| **P619** | Earth Fault Protection Action | 0 = Alarm<br>1 = Switch off (TRIP) | 1 = Switch off (TRIP) | | Sys, rw |
| **P620** | Phase Loss Time | 0 = Disabled<br>1 to 99 s = Enabled | 3 s | | Sys, rw |
| **P621** | Phase Loss Protection Action | 0 = Alarm<br>1 = Switch off (TRIP) | 1 = Switch off (TRIP) | | Sys, rw |
| **P622** | Overcurrent | 50 to 1000 % | 400 % | | Sys, rw |
| **P623** | Overcurrent Time | 0 = Disabled<br>1 to 99 s = Enabled | 3 s | | Sys, rw |
| **P624** | Overcurrent Protection Action | 0 = Alarm<br>1 = Switch off (TRIP) | 1 = Switch off (TRIP) | | Sys, rw |
| **P625** | Undercurrent | 5 to 100 % | 20 % | | Sys, rw |
| **P626** | Undercurrent Time | 0 = Disabled<br>1 to 99 s = Enabled | 0 s | | Sys, rw |
| **P627** | Undercurrent Protection Action | 0 = Alarm<br>1 = Switch off (TRIP) | 1 = Switch off (TRIP) | | Sys, rw |
| **P628** | Frequency out of Range | 5 to 20 % | 5 % | | Sys, rw |
| **P629** | Frequency out of Range time | 0 = Disabled<br>1 to 99 s = Enabled | 0 s | | Sys, rw |
| **P630** | Frequency out of Range Protection Action | 0 = Alarm<br>1 = Switch off (TRIP) | 1 = Switch off (TRIP) | | Sys, rw |
| **P631** | Earth Leakage Protection | 0 = Disabled<br>1 = Enabled | 0 = Disabled | | Sys, rw |
| **P632** | Earth Leakage Current Level Selection | 0 = 0.3 A<br>1 = 0.5 A<br>2 = 1 A<br>3 = 2 A<br>4 = 3 A<br>5 = 5 A | 2 = 1A | | Sys, rw |
| **P633** | Earth Leakage Time | 0.1 to 25.0 s | 0.5 s | | Sys, rw |
| **P634** | Earth Leakage Protection Action | 0 = Alarm<br>1 = Switch off (TRIP) | 1 = Switch off (TRIP) | | Sys, rw |
| **P635** | Earth Leakage Start up Inhibit | 0 = Disabled<br>1 = Enabled | 0 = Disabled | | Sys, rw |
| **P636** | Earth Leakage Start up Time Inhibit | 1 to 600 s | 5 s | | Sys, rw |
| **P637** | Earth Leakage Short circuit Trip Inhibit | 0 = Disabled<br>1 = Enabled | 0 = Disabled | | Sys, rw |

| Parameter | Description | Adjustable Range | Factory Setting | User Setting | Proprieties |
|---|---|---|---|---|---|
| **P640** | Relay Tripping Class | 0 = Disabled<br>1 = Class 5<br>2 = Class 10<br>3 = Class 15<br>4 = Class 20<br>5 = Class 25<br>6 = Class 30<br>7 = Class 35<br>8 = Class 40<br>9 = Class 45 | 2 = Class 10 | | Sys, rw |
| **P641** | Overload Protection Action | 0 = Alarm<br>1 = Switch off (TRIP) | 1 = Switch off (TRIP) | | Sys, rw |
| **P642** | Cooling Time | 0 = Disabled<br>1 to 3600 s =Enabled | 0 s | | Sys, rw |
| **P643** | Auto-reset | 0 = Disabled<br>1 = Enabled | 0 = Disabled | | Sys, rw |
| **P644** | PTC Protection | 0 = Disabled<br>1 = Enabled | 0 = Disabled | | Sys, rw |
| **P645** | PTC Protection Action | 0 = Alarm<br>1 = Switch off (TRIP) | 1 = Switch off (TRIP) | | Sys, rw |
| **P703** | Bus Off Reset | 0 = Manual<br>1 = Automatic | 1 = Automatic | | Sys, CFG |
| **P705** | CAN Controller Status | 0 = Inactive<br>1 = Auto-baud<br>2 = CAN Active<br>3 = Alarm<br>4 = Error Passive<br>5 = Bus Off<br>6 = Without Power Supply | - | | RO |
| **P707** | Transmitted CAN Telegrams Counter | 0 to 65535 | - | | RO |
| **P708** | Bus Off Counter | 0 to 65535 | - | | RO |
| **P709** | Lost CAN Telegrams Counter | 0 to 65535 | | | RO |
| **P719** | DeviceNet Network Status | 0 = Offline<br>1 = Online, Not Connected<br>2 = Online Connected<br>3 = Expired Connection<br>4 = Connection Fault<br>5 = Auto-Baud | - | | RO |
| **P720** | DeviceNet Master Status | 0 = Run<br>1 = Idle | - | | RO |
| **P725** | Communication Module Address | 0 to 255 | 63 | | Sys, CFG |
| **P726** | DeviceNet/Modbus Baud Rate | 0 = 125 kbit/s / 4.8 kbit/s<br>1 = 250 kbit/s / 9.6 kbit/s<br>2 = 500 kbit/s /19.2 kbit/s<br>3 = Autobaud / 38.4 kbit/s | 3 = Autobaud / 38.4 kbit/s | | Sys, CFG |
| **P727** | DeviceNet Data Profile | 0 = ODVA<br>1 = WEG | 0 = ODVA | | Sys, CFG |
| **P728** | Number of Words from the Slave to the Master | 1 to 5 | 1 | | Sys, CFG |
| **P729** | Status Word # 1 | 0 to 65535 | - | | RO |
| **P730** | Parameter Transmitted at Word # 2 | 0 to 999 | 0 | | Sys, rw |
| **P731** | Parameter Transmitted at Word # 3 | 0 to 999 | 0 | | Sys, rw |
| **P732** | Parameter Transmitted at Word # 4 | 0 to 999 | 0 | | Sys, rw |
| **P733** | Parameter Transmitted at Word # 5 | 0 to 999 | 0 | | Sys, rw |
| **P734** | Number of Words from the Master to the Slave | 1 to 2 | 1 | | Sys, rw |
| **P735** | Control Word # 1 | 0 to 65535 | - | | RO |
| **P736** | Parameter Received at Word # 2 | 0 to 999 | 0 | | Sys, rw |

| Parameter | Description | Adjustable Range | Factory Setting | User Setting | Proprieties |
|---|---|---|---|---|---|
| **P740** | Profibus Network Status | 0 = Inactive<br>1 = Initialization error<br>2 = Offline<br>3 = Configuration data error<br>4 = Parameter data error<br>5 = Clear mode<br>6 = Online | - | | RO |
| **P770 to P775** | Reading Programmable Parameter #1 to #6 | 0 to 999 | 0 | | Sys, rw |
| **P780 to P785** | Value of the Reading Programmable Parameter #1 to #6 | 0 to 65535 | 0 | | RO |
| **P800 to P899** | User Parameters | 0 to 65535 | 0 | | Us, rw |

RO = Read-only parameter.

rw = Reading/writing parameter.

CFG = Configuration parameter, it can only be changed with a stopped motor.

Sys = System parameter. Its value is updated when the PROG key is pressed.

Us = User parameter. Its value is instantaneously updated by the HMI, even before pressing the PROG key.

# 3 GENERAL INFORMATION

## 3.1 TERMS AND DEFINITIONS USED IN THE MANUAL

ELS: Earth Leakage Sensor.

RCD: According to IEC 60755, mechanical switching device (or device association) developed to cause contacts to open when a residual current reaches a certain value under specific conditions (Residual Current Device).

FLA: Set Current at Full Load (Full Load Amps).

## 3.2 ABOUT SRW 01

It was added one more component to the SRW 01:

**(g) Earth Leakage sensors - SRW01-ELS**

1 – SRW 01-EL1
2 – SRW 01-EL2
3 – SRW 01-EL3
4 – SRW 01-EL4

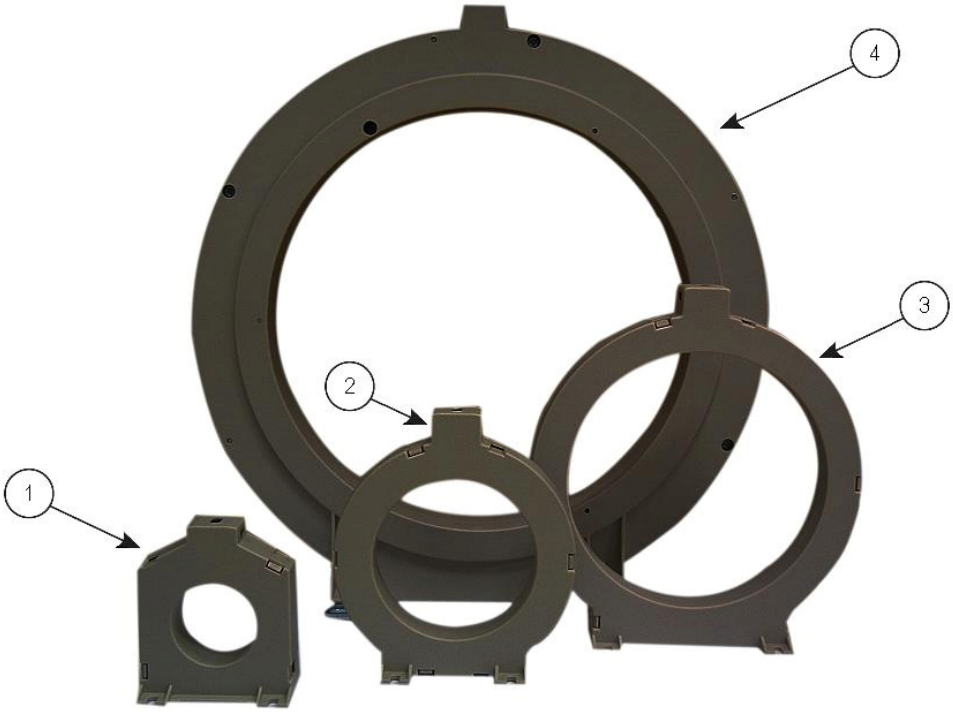



***Figure 3.1:*** *SRW 01 new component*

## 3.3 SRW 01 IDENTIFICATION LABEL

1 – Product model
2 – WEG part number
3 – Serial number
4 – Manufacturing date
5 – Maximum ambient temperature
6 – Firmware version
7 – UC supply voltage (voltage and frequency)
8 – I1 to I4 digital input voltage
9 – Connection to the input terminals S1 and S2
10 – UMC current range
11 – Protection degree

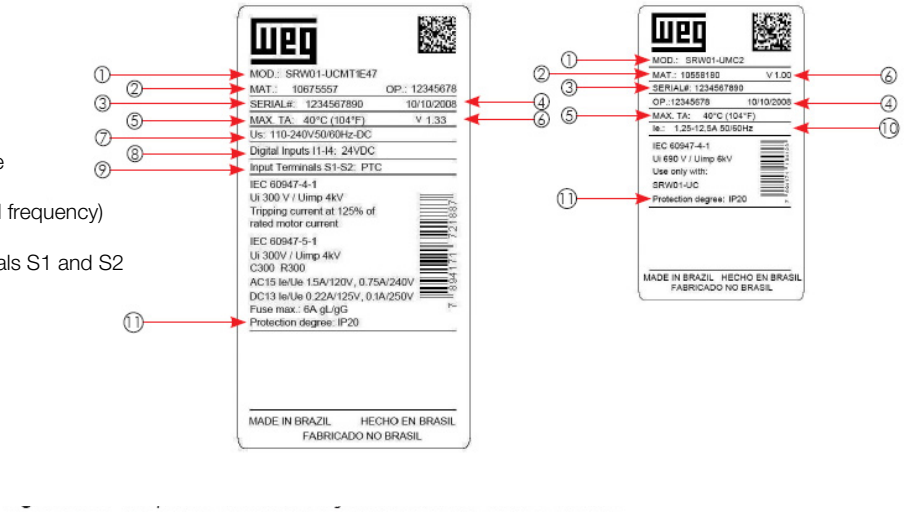



***Figure 3.2:*** *Identification label the UC and UMC sides*

On the superior part of the Control Unit there is a warning tag that informs which the voltage of the digital inputs is and what the function of terminals S1 and S2 for the acquired model is.


***Figure 3.3:*** *Warning Tag on the superior part of Control Unit*

# 4 INSTALLATION AND CONNECTION

## 4.1 ELECTRICAL INSTALLATION

**DANGER!**

The following information serves as guidance for a correct installation. The applicable electrical installation regulations must also be followed.

**DANGER!**

Make sure the AC power supply is disconnected before beginning the connections.

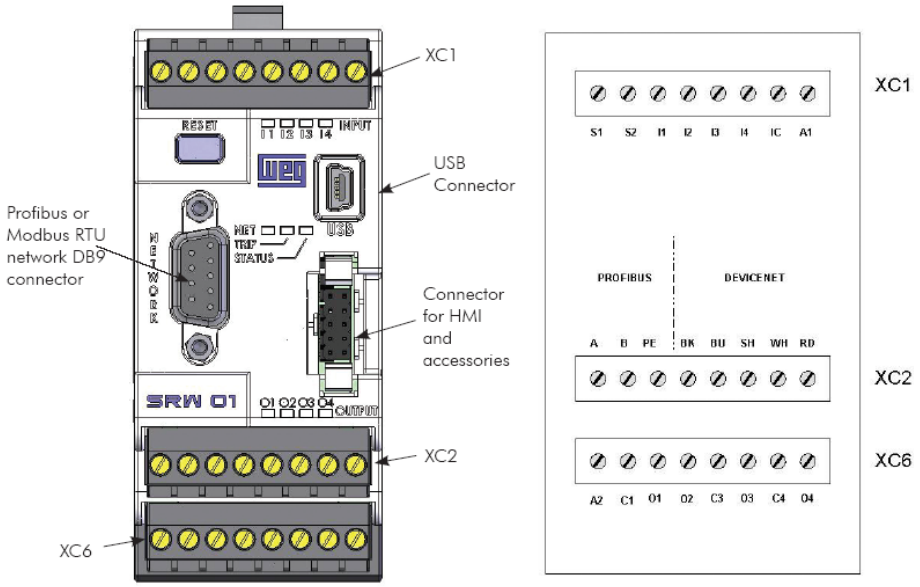



***Figure 4.1:*** *Control unit connections*

**XC1 terminal strip:**

- Inputs S1 and S2 – PTC or Earth Leakage Sensor;
- Digital inputs – I1, I2, I3 and I4;
- 24 Vdc output for the 24 Vdc digital inputs or common for the 110 Vac digital inputs – IC;
- Power supply terminal A1.

**NOTE!**

Check the nameplate or the warning tag on the product to know which model of the control unit was acquired:

- Digital inputs activated with 24 Vdc or with 110 Vac;
- PTC protection or earth leakage (RCD).

**XC2 terminal strip:**

- Profibus or Modbus – A, B and PE;
- DeviceNet – BK, BU, SH, WH and RD.

**NOTE!**

Refer to the used communication module manual for the pinout and wiring diagram.

**XC6 terminal strip:**

- Power supply terminal A2;
- Digital outputs – O1, O2, O3 and O4. The outputs O1 and O2 share the common terminal C1.

**ATTENTION!**

The incorrect application or installation of the SRW 01 may result in damage to its components, faults or reduction of the useful life of the product due to wiring or application errors, as well as the incorrect setting of the operation mode, rated current of the motor, incorrect selection of the Current Measuring Unit, incorrect or improper supply source for the digital inputs and/or Devicenet, application of voltage on the terminals S1 and S2.

## 4.2 CURRENT MEASUREMENT UNIT (UMC) CONNECTION

The SRW 01 has 6 current measurement units:

- UMC1 (0.5 – 5 A) **(*)**
- UMC2 (1.25 – 12.5 A)
- UMC3 (2.5 – 25 A)
- UMC4 (12.5 – 125 A)
- UMC5 (42 - 420 A)
- UMC6 (84 – 840 A)

(*) For the 0.25 -2.5 A range the UMC1 (5 A) with 2 turns in the primary must be used, according to the figure 4.2.

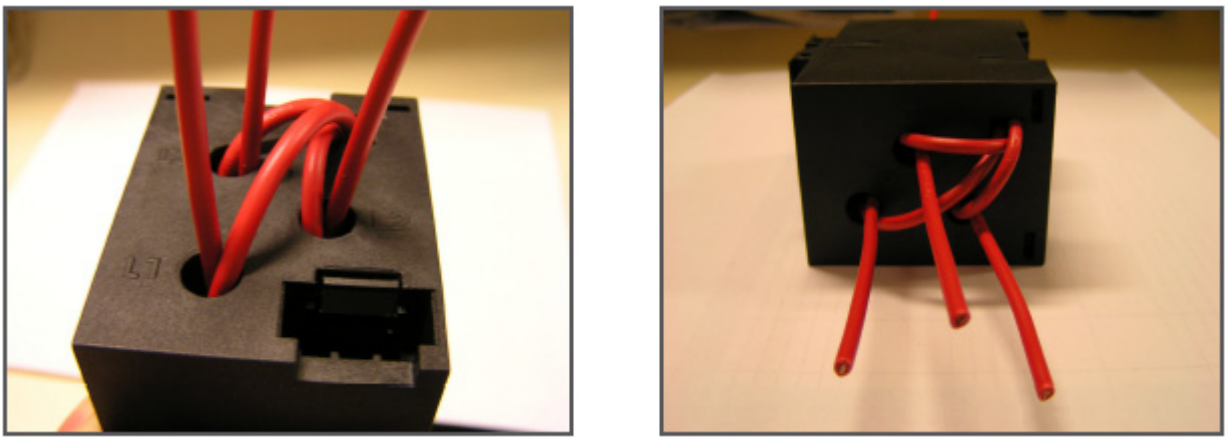


***Figure 4.2:*** *0.25 to 2.5 A current range connection - two turns in the UMC1*

The current measurement unit (UMC) measures the current of the 3 motor phases. The RMS current value of each phase is transmitted digitally to the control unit. The control unit (UC) signalizes through the Status LED and through the E0085 message on the HMI when the current measurement unit is not communicating with the UC.

**NOTE!**

The Control Unit (UC) reports value 0 (zero) for the reading of currents if the measured current is below 15% of the rated current (P401 and/or P402).

**ATTENTION!**

The incorrect selection of the Current Measuring Unit using parameter P295 may result in the incorrect communication of the measured current value sent to the Control Unit.

## 4.3 CONNECTION OF THE EARTH LEAKAGE SENSOR (ELS)

The earth leakage sensor is installed separately from the Control Unit. It can be installed in any position and it is connected to the Control Unit by a pair of braided and/or shielded wires, connected to the sensor terminals and to terminals S1 and S2 of the Control Unit. The distance of the connections between the earth leakage sensor and the Control Unit must be the smallest possible. The maximum recommended is 10 m.

The EL1(Ø 35 mm) earth leakage sensor can be assembled with M3 screws or directly on a DIN 35 mm rail using the adapter accessory.

The EL2 (Ø 70 mm), EL3 (Ø 120 mm) and EL4 (Ø 210 mm) sensors can only be assembled using screws. The EL2 and EL3 sensors are fixed by M3 screws and the EL4 sensor is fixed by M6 screws.

It is recommended to use the equivalence ratio between the current measuring units and the earth leakage sensors (ELS) for installation as shown on the table below.

***Table 4.1:*** *Equivalence between Current Measuring Units and ELS*

| Current Measuring Unit (UMC) | Earth Leakage Sensor (ELS) |
|---|---|
| SRW01-UMC0<br>SRW01-UMC1<br>SRW01-UMC2<br>SRW01-UMC3 | SRW01-EL1 |
| SRW01-UMC4 | SRW01-EL2 |
| SRW01-UMC5 | SRW01-EL3 |
| SRW01-UMC6 | SRW01-EL4 |

**NOTE!**

If the measured earth leakage current is inferior to 50 mA, the value 0 (zero) will be indicated on parameters P036 and P037.

**NOTE!**

Earth leakage protection is available only on version SRW 01-RCD.

Check if the acquired Control Unit model has this functionality.

## 4.4 SHORT CIRCUIT RANGES (UL)

The SRW01-UC and SRW01-UMC devices (UL Certificates), are appropriate to use in circuits with capacity to produce the symmetrical effective current (RMS) below 200.000 A with maximum voltage of 600 V. (This value of short circuit current is related to the use of non delayed fuses connected between the exterior enclosure/panel and the connector of the supply source (L2)).

# 5 HUMAN-MACHINE INTERFACE (HMI)

## 5.1 COPY FUNCTION

The SRW 01 copy function allows the storage of up to 3 parameter sets and/or 3 user programs.
It presents two procedures:

1 - Data upload: From the SRW 01 to the HMI;
2 - Data Download: From the HMI to the SRW 01.

After storing the parameters of the SRW 01 on the HMI it is possible to repass them to another relay using this function (P500). However, the relays must not have different hardware nor firmware versions. Check the nameplate to verify the version of the product.
It is understood that “different hardware" is the model of the control unit with PTC protection (SRW01-PTC) or earth leakage (SRW01-RCD) and that "different version” are those that are different in “x” or “y” supposing that the number of the firmware versions are described as Vx.yz.

When downloading the parameters (P500), if there is a conflict between the different hardware and/or firmware versions, the control unit will signal fault on the STATUS led and a “E0010” message on the HMI. Hardware and/or firmware differences are not verified when downloading the user program (P501).

**NOTE!**
The procedure of data download will not be performed, if the control unit (UC) indentifies the inexistence of a user program or parameterization saved on the HMI. The upload of a user program will not be performed if there is not a program saved on the control unit (UC). In this case, the message “NULL” will flash on the HMI for two seconds.

**ATTENTION!**
Make sure the data download is done from the correct memory position, P500/501 = 4, 5 or 6. Perform this procedure only when the motor is disconnected from the power line.

# 6 PARAMETERIZATION

The system parameters of the Reading/Writing type can be divided into two groups: Control and Protection.

The Control group defines:

- Local/Remote Selection;
- Local Command Selection;
- Digital Inputs and Outputs;
- Operation Mode;
- Motor Configuration;
- Communication Network Configuration.

The Protection group defines:

- Current Imbalance Configuration;
- Earth Fault Configuration;
- Phase Loss Configuration;
- Overcurrent and Undercurrent Configuration;
- Frequency Out of Range Configuration;
- PTC Configuration;
- Overload Configuration;
- Earth Leakage Configuration;
- External Fault Configuration;
- Reset Button Selection;
- Auto-Reset Configuration.

**NOTE!**

- PTC protection available only on version SRW 01-PTC.
- Earth leakage protection is available only on version SRW 01-RCD.
- Check the nameplate or the warning tag on the product to know which model of the control unit was acquired.

**NOTE!**

There are parameters that can be changed only with the motor deenergized. In an attempt to change those parameters with the motor on, the message “STOP” will flash during 3 seconds on the HMI and the modification will not be accepted.

## 6.1 LOCAL COMMAND

If the Local mode is selected, the origin of the local commands must be defined at the parameter P229.

**P229 – Local command Selection**

| | | |
|---|---|---|
| **Adjustable Range:** | 0 = Ix<br>1 = HMI<br>2 = USB/Ladder | **Factory Setting:** 0 |
| **Proprieties:** Sys, rw | | |

**Description:**

It defines the origin of the local commands.

If P229 = 0, the local controls (on, off, revert, etc.) are controlled by digital inputs I1 to I4.

If P229 = 1, the local controls (on, off, revert, etc.) are controlled by keys  ,  and  of the HMI.

P229 = 2 USB/Ladder – The Local commands (start, stop, reversion, etc.) are sent by the monitoring dialog box "Control/Signals" through the LC1, LC2 and LC3 commands via USB, or by the ladder user program via the system bit markers SX3001 … SX3003 (refer to the WLP manual).

**NOTE!**

The "Reset" button in the monitoring dialog box "Control/Signals" works always, regardless of the P229 or P601 programming.

**P230 – Command (Ix) Two or Three wires**

| | | |
|---|---|---|
| **Adjustable Range:** | 0 = Two wires (Switch)<br>1 = Three wires (Pushbutton) | **Factory Setting:** 1 |
| **Proprieties:** Sys, CFG | | |

**Description:**

If P229 = 0 is selected, once defining that the local controls are controlled by the digital inputs, it is possible to select the type of control by:

- Two wires (Switch);
- Three wires (Pushbutton).

| Type of Control | Behavior logic of digital inputs |
|---|---|
| Two wires (Switch) | ■ After detecting a start control, transition of the signal (0 → 1) by the rising edge of the digital input, the Control Unit according to the Operation Mode (P202), ables the digital output(s), driving the motor. The motor keeps drive while the digital input signal is on level 1 (active). If there is a signal transition to level 0, a stop control will be set. |
| Three wires (Pushbutton) | ■ After detecting a start control, transition of the signal (0 → 1) by the rising edge of the digital input, the Control Unit according to the Operation Mode (P202), ables the digital output(s), driving the motor.<br>■ After detecting a stop control, digital input I1 on level 0, the Control Unit disables the digital output (s), stopping the motor. |

**NOTE!**

The control logic assigned to the digital inputs I1 to I4 and the digital outputs O1 to O4, is described in item 6.3 of this addendum, for each previously defined Operation Mode (P202).

**NOTE!**

The OFF control logic for three wires (Pushbuttons) can be changed from active on level 0, normally closed (NC) to active on level 1, normally open (NO), using parameter P231.

**P231 – Logic Stop Command Local Mode (Ix) Three wires**

| | | | |
|---|---|---|---|
| **Adjustable Range:** | 0 = Digital Input I1 (NC)<br>1 = Digital Input I1 (NO) | **Factory Setting:** | 0 |
| **Proprieties:** Sys, CFG | | | |

**Description:**

It allows the user to define the OFF control logic when in Local Mode the control is selected by the P229 = 0 digital inputs and control logic for three wires (Pushbuttons) P230 = 1, as per the Operation Mode (P202) selected.

**ATTENTION!**

The OFF control logic for drive in Local Mode through P229 = 0 digital inputs and control logic for three wires (Pushbuttons) P230 = 1 as a standard is active on level 0, P231 = 0. This assures that the Control Unit will stop the motor if the wires break.

## 6.2 DIGITAL INPUTS AND OUTPUTS

The SRW 01 presents 4 digital inputs that can be activated with a 24 Vdc or 110 Vac (according to the acquired model) voltage. It has an internal isolated 24 Vdc power supply exclusively for the operation of the digital inputs. The installation diagram is presented in the section 3.8 of the SRW 01 User Manual V1.3X.

It also presents 4 relay outputs that are configured through the parameters P277, P278, P279 and P280.The connection diagram is presented in the section 3.9 of the SRW 01 User Manual V1.3X.

## P277 – Digital Output O1 Function

## P278 – Digital Output O2 Function

## P279 – Digital Output O3 Function

## P280 – Digital Output O4 Function

| | | | |
|---|---|---|---|
| **Adjustable Range:** | 0 = Internal Use (P202)<br>1 = Ladder<br>2 = Fieldbus<br>3 = Alarm/Fault Signal (NO)<br>4 = Trip/Error Signal (NO)<br>5 = Trip/Error Signal (NC) | **Factory Setting:** | P277 = 1<br>P278 = 1<br>P279 = 1<br>P280 = 1 |
| **Proprieties:** Sys, CFG | | | |

**Description:**

They define the relay output control origin.

**Internal Use:** it is used according to selected operation mode (P202);

**Ladder:** it is used by the user program implemented in Ladder;

**Fieldbus:** it is used directly by the industrial network master.

**Alarm/Fault (NO) Signal:** it is used to signal Alarm or Fault. In case of Alarm or Fault the output is closed, remaining like this until the cause of Fault is not present anymore and the reset control is set.

**Trip/Error (NO) Signal:** it is used to signal Trip or Error. In case of Trip or Error (Ex. No communication with the Current Measuring Unit) the output is closed, remaining this until the cause of the Fault is not present anymore and the reset control is set.

**Trip/Error (NC) Signal:** it is used to signal Trip or Error. In case of Trip or Error (Ex. No communication with the Current Measuring Unit) the output is closed, remaining like this until the cause of the Fault is not present anymore and the reset control is set.

**NOTE!**

The user can change the value of the parameter P277, P278, P279 or P280 according to the table 6.1. If the user does not respect the output availability for each operation mode an error will be generated and the control unit (UC) will signalize through the Status LED and via the message “E0024” on the HMI.

***Table 6.1:*** *Digital output availability*

| Operation mode | Output 1 – O1 | Output 2 – O2 | Output 3 – O3 | Output 4 – O4 |
|---|---|---|---|---|
| Transparent | Ladder | Ladder | Ladder | Ladder |
| Overload Relay | Internal use | Internal use | Ladder | Ladder |
| Direct Starter | Internal use | Ladder | Ladder | Ladder |
| Reversing Starter | Internal use | Internal use | Ladder | Ladder |
| Star/Delta Starter | Internal use | Internal use | Internal use | Ladder |
| Dahlander Starter | Internal use | Internal use | Internal use | Ladder |
| Pole Changing Starter | Internal use | Internal use | Ladder | Ladder |
| PLC | Ladder | Ladder | Ladder | Ladder |

The parameters P012 and P013 present the status of the digital inputs and outputs, respectively.

**NOTE!**

The contents of the parameters P012 and P013 represent a binary number where each bit corresponds to one logic state. Its content is showed as binary on the HMI.

## P012 – Digital Input Status

| | | |
|---|---|---|
| **Adjustable Range:** | bit 0 = I1<br>bit 1 = I2<br>bit 2 = I3<br>bit 3 = I4 | **Factory Setting:** - |
| **Proprieties:** RO | | |

**Description:**

It monitors the status of the digital inputs Ix.

E.g.: P012 = 12 = 1100b. It means that the digital inputs I3 and I4 are actuated.

## P013 – Digital Output Status

| | | |
|---|---|---|
| **Adjustable Range:** | bit 0 = O1<br>bit 1 = O2<br>bit 2 = O3<br>bit 3 = O4 | **Factory Setting:** - |
| **Proprieties:** RO | | |

**Description:**

It monitors the status of the digital outputs Ox.

E.g.: P013 = 12 = 1100b. It means that the digital outputs O3 and O4 are activated.

## 6.3 SRW 01 CHECK BACK

Parameters P208, P209 and P211 configure the check back of the SRW 01 for each operation mode which assures that the motor was really driven and checking if it keeps this way until a stop control is identified or assuring that the motor keeps at standstill until a start control is identified. The digital inputs that can be used as check back depend on the Operation Mode (P202). Consult the following connection schemes.

### P208 – Check Back Type

| | | | |
|---|---|---|---|
| **Adjustable Range:** | 0 = Motor Current<br>1 = Digital Input Ix<br>2 = Simulation | **Factory Setting:** | 0 |
| **Proprieties:** | Sys, CFG | | |

**Description:**

Define the check back of the switch ON/OFF control of the motor.

**NOTE!**

Parameter P208 configured for simulation (P208 = 2) does not monitor the switch ON/OFF control of the motor. Therefore, it must be used only for testing.

### P209 – Execution Time

| | | | |
|---|---|---|---|
| **Adjustable Range:** | 100 to 2000 ms | **Factory Setting:** | 200 ms |
| **Proprieties:** | Sys, CFG | | |

**Description:**

It defines the maximum waiting time of the check back signal to assure the setting of the ON and OFF controls.

If the Control Unit identifies an ON control and does not receive the check back signal in the time defined on P209, an error will be generated and the control unit will send out a signal through the STATUS led and message “E0078” on the HMI.

If the Control Unit identifies an OFF control and keeps receiving the check back signal in the time defined on P209, an error will be generated and the control unit will send out a signal through the STATUS led and message “E0079” on the HMI.

**NOTE!**

On Firmware versions 1.34 and earlier, parameter P209 was defined as Run Time.

## P211 – Check Back Time

| | | | |
|---|---|---|---|
| **Adjustable Range:** | 0 to 2000 ms | **Factory Setting:** | 200 ms |
| **Proprieties:** Sys, CFG | | | |

**Description:**

It defines the waiting time for the check back signal to go back to its normal working state in the case of the change of state without the suitable control for change.

The Control Unit monitors the check back signal continuously. If it changes without the corresponding ON/OFF control, it will wait until for it to go back to the normal state during the maximum time set on P211.

If after having confirmed the setting of the stop control the Control Unit identifies the change of state of the check back signal without the suitable ON control, an error will be generated and the control unit will send out a signal through the STATUS led and message “E0080” on the HMI.

If after having confirmed the setting of the stop control the Control Unit identifies the change of state of the check back signal without the suitable ON control, an error will be generated and the control unit will send out a signal through the STATUS led and message “E0081” on the HMI.

The following diagram exemplifies the operation of the check back signal verification:

- Check Back start control;
- Check Back stop control;
- Check Back standstill;
- Check Back operation.

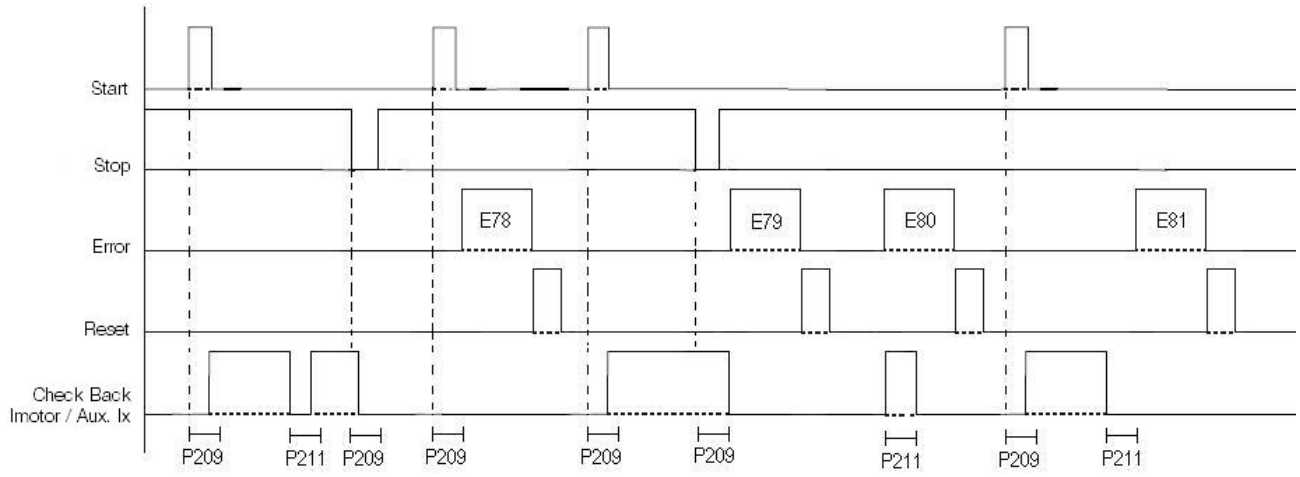



***Figure 6.1:*** *Diagram of operation of the Check Back signal verification*

## 6.4 OPERATION MODES

### 6.4.1 Transparent Mode

The transparent mode allows the user to develop its own application using the WLP software ladder language. The maximum allowed program size is 64 kB. The digital inputs and outputs can be used according to the application needs and are configured. The digital inputs and outputs can be used according to the need of the application and are configured as per table 6.2.

***Table 6.2:*** *Configuration of the digital inputs and outputs for the Transparent operation mode*

| Digital Inputs /Outputs | Function |
|---|---|
| I1 | Free |
| I2 | Free |
| I3 | Free |
| I4 | Free |
| O1 | Ladder |
| O2 | Ladder |
| O3 | Ladder |
| O4 | Ladder |

**ATTENTION!**

If either Error or Trip occurs in the transparent mode, the SRW 01 will not automatically switch off its outputs. Protections must be programmed by the user with the Error or Trip bits in the SRW 01 Ladder logic.

#### 6.4.1.1 Connection Diagram – Transparent Mode

The scheme on figure 6.2 shows an example of the use of the SRW 01 on the Transparent operation mode with drive through the digital inputs at 24 Vdc, where on the Ladder programming digital input I1 turns the motor ON/OFF, digital input I2 is used as a Check Back signal and digital output O1 drives the motor.

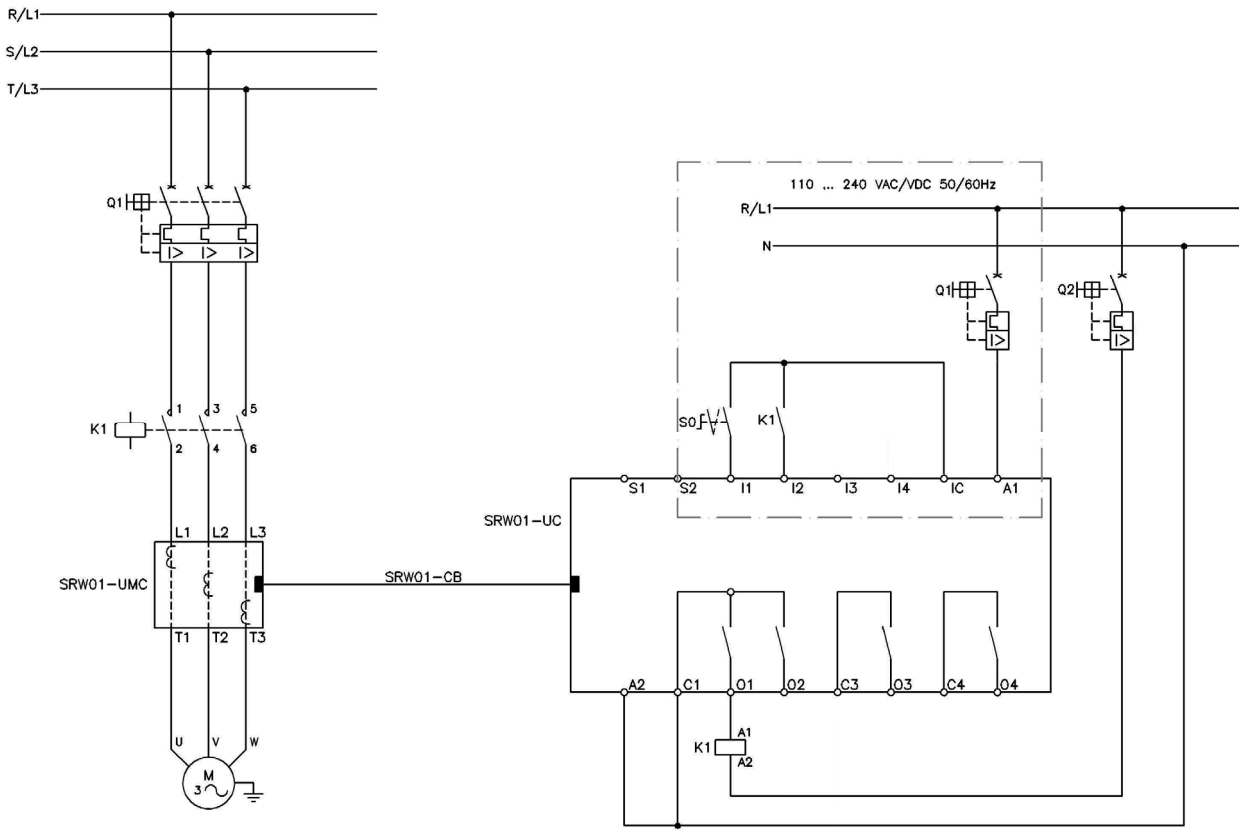



***Figure 6.2:*** *Connection scheme for the Transparent Operation Mode using digital inputs at 24 Vdc.*

The modification of the scheme for the control unit with digital inputs at 110 Vac is shown on figure 6.3.

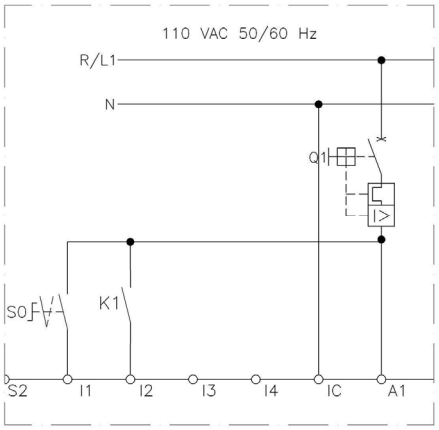



***Figure 6.3:*** *Detail modification for drive using digital inputs at 110 Vac*

### 6.4.2 Overload Relay

In this operation mode the SRW 01 presents operation characteristics similar to an overload relay, using one NO (normally open) digital output and another NC (normally closed). The other digital outputs can be used according to the user's needs.

In case of a TRIP event, the NC output opens and the NO closes. The NC output must be used in series with the motor starting contactor coil, in order to switch it off in case of a Trip. The NO output, however, can be used to activate an alarm or an indication lamp.

Digital inputs and outputs are configured as per table 6.3.

***Table 6.3:*** *Configuration of the digital inputs and outputs for Overload Relay operation mode*

| Digital Inputs /Outputs | Function |
|---|---|
| I1 | Free |
| I2 | Free |
| I3 | Free |
| I4 | Free |
| O1 | TRIP - NO |
| O2 | TRIP - NC |
| O3 | Ladder |
| O4 | Ladder |

### 6.4.2.1 Connection Diagram – Overload Relay

The scheme on figure 6.4 shows an example of the use of the SRW 01 on the Overload Relay operation mode where the digital inputs I1 to I4 driven at 24 Vdc and the digital outputs O3 and O4 can be used according to the user's needs.

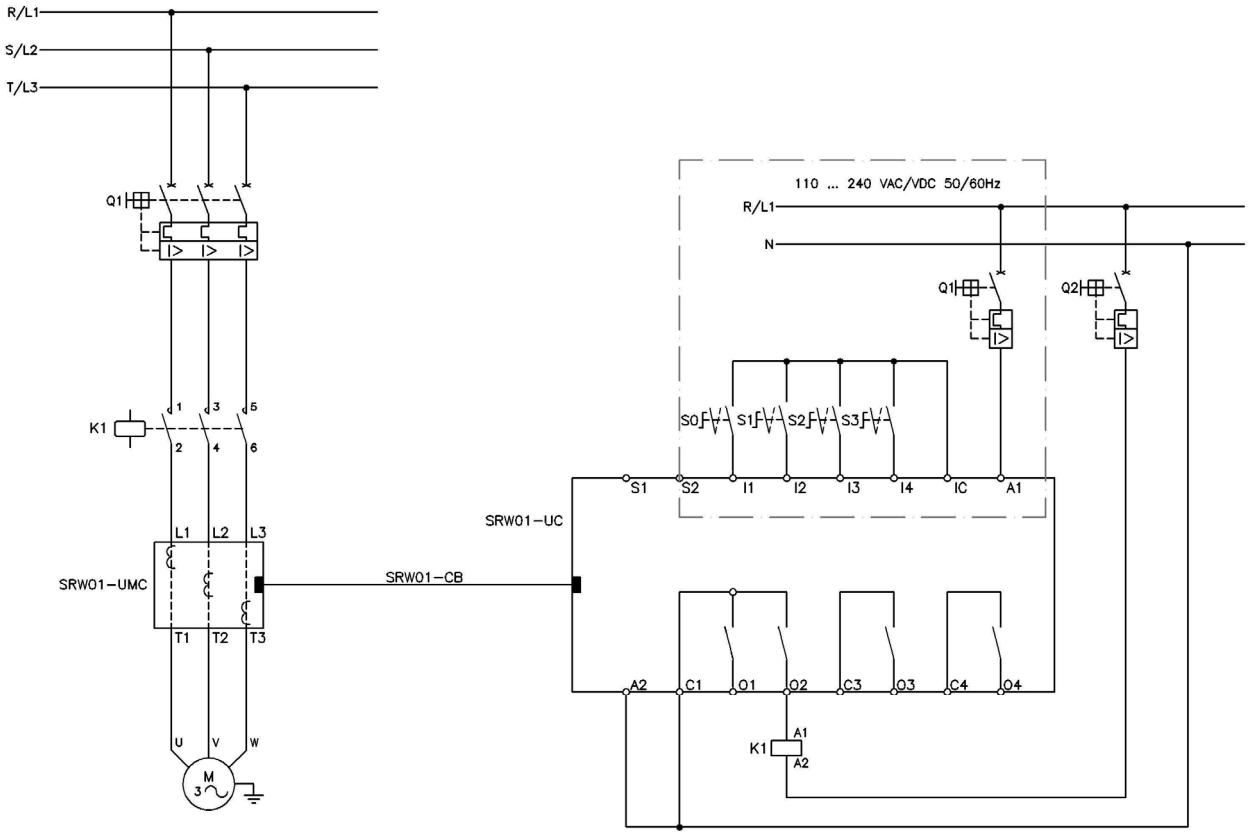



***Figure 6.4:*** *Connection scheme for the Overload Relay operation mode using digital inputs at 24 Vdc.*

The modification of the scheme for the control unit with digital inputs at 110 Vac is shown on figure 6.5.

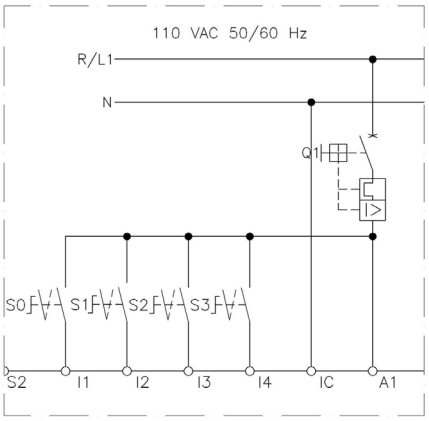



***Figure 6.5:*** *Detailed modification for drive using the digital inputs at 110 Vac*

### 6.4.3 DIRECT STARTER

In this mode a direct on line starter for single-phase or three-phase motors is configured, where the digital O1 is reserved for operating the motor starting contactor. The other digital outputs can be used according the user's needs.

In case of a TRIP, the digital output O1 switches off the starting contactor, thus stopping the motor.

Digital inputs and outputs are configured as per table 6.4.

***Table 6.4:*** *Configuration of the digital inputs and outputs for the Direct Starting operation mode*

| Digital Inputs /Outputs | Function | |
|---|---|---|
| | Control Logic 3 wires (Pushbuttons) | Control Logic 2 wires (Switch) |
| I1 | Stop Pushbutton | Free |
| I2 | Start Pushbutton | ON/OFF Switch |
| I3 (*) | Check Back | |
| I4 | Free | Free |
| O1 | Contactor operation | |
| O2 | Ladder | |
| O3 | Ladder | |
| O4 | Ladder | |

**(*)** Adjust P208 according to the application.

#### 6.4.3.1 Connection Diagram – Direct Starter

The scheme on figure 6.6 shows an example of the use of the SRW 01 on the Direct Starting operation mode with drive through the digital inputs (P229 = 0) at 24 Vdc using control logic of control with three wires (pushbuttons) (P230 = 1).

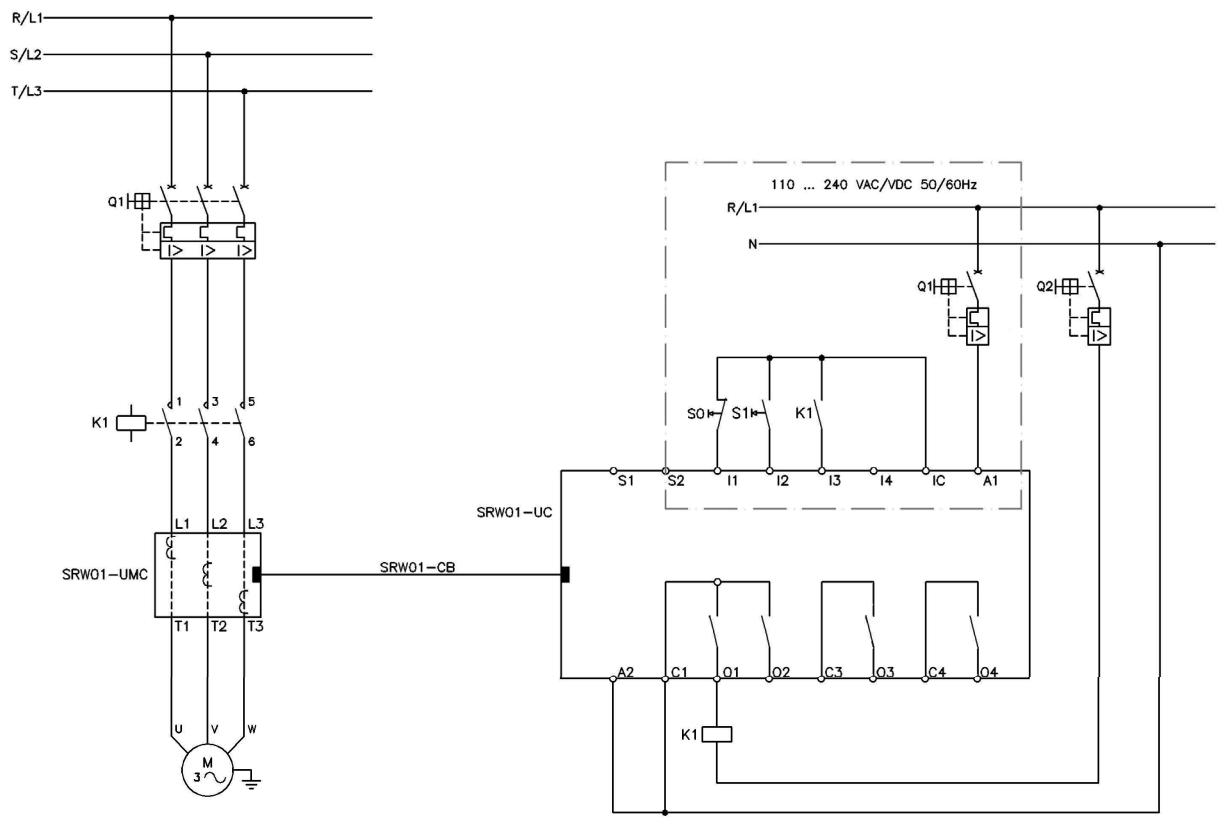
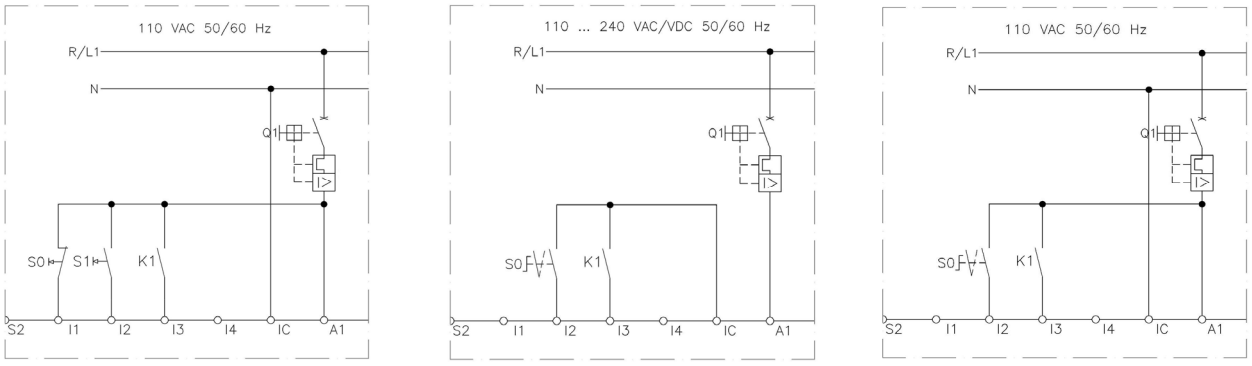



***Figure 6.6:*** *Connection scheme for the Direct Starting Operation Mode using digital inputs at 24 Vdc and driven by pushbuttons (P230 = 1)*

The modification of the scheme for the control unit with digital inputs at 110 Vac is shown on figure 6.7 **(a)**.

The modifications of the scheme for drive through the digital inputs (P229 = 0) at 24 Vdc, and at 110 Vac using two wires (switch) control logic (P230 = 0) are shown on figure 6.7 **(b)** and **(c)**.




**(a)** **(b)** **(c)**

***Figure 6.7 (a):*** *Detail modification for drive using digital inputs at 110 Vac and driven by pushbuttons (P230 = 1)*

***(b):*** *Detail modification for drive using digital inputs at 24 Vdc and*

***(c):*** *Digital inputs at 110 Vac both with switch drive (P230 = 0)*

### 6.4.3.2 Operation Diagram – Direct Starter

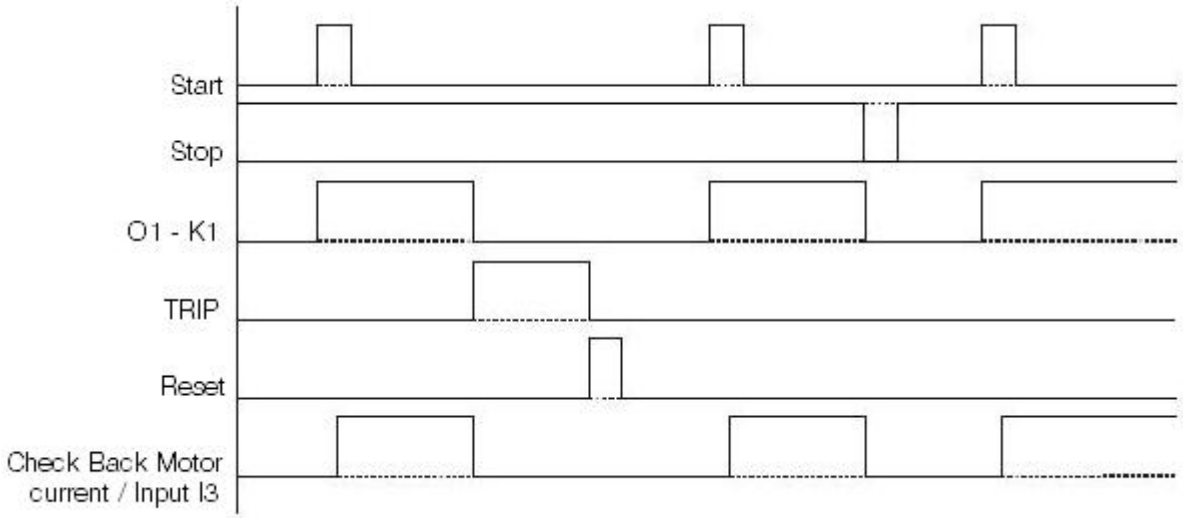



***Figure 6.8:*** *Operation diagram for the Direct Starter Operation Mode*

### 6.4.4 Reversing Starter

In this mode a reversing starter for three-phase motors is configured. The digital outputs O1 and O2 are reserved for the operation of the motor starting contactors. The other digital outputs can be used according to the user's needs. In case of a TRIP, the digital outputs O1 and O2 switch off the starting contactors, thus stopping the motor.
Digital inputs and outputs are configured as per table 6.5.

***Table 6.5:*** *Configuration of the digital inputs and outputs for the Reverter Starting operation mode*

| Digital Inputs /Outputs | Function | |
|---|---|---|
| | **Control Logic 3 wires (Pushbuttons)** | **Control Logic 2 wires (Switch)** |
| I1 | Stop Pushbutton | Free |
| I2 | Direct ON Button | Direct ON/OFF switch |
| I3 | Reverse ON Button | Reverse ON/OFF switch |
| I4 (*) | Check Back | |
| O1 | Forward Contactor Operation | |
| O2 | Reverse Contactor Operation | |
| O3 | Ladder | |
| O4 | Ladder | |

**(*)** Adjust P208 according to the application.

**NOTE!**

It is possible to make the motor reversion in two ways:

- By means of a stop control followed by a reverter control;
- By means of a reverter control without the need of the stop control. This way, the reverter control will only be set after the time defined on parameter P212.

## P212 – Motor Transition Time

| | | | |
|---|---|---|---|
| **Adjustable Range:** | 50 to 5000 ms | **Factory Setting:** | 50 ms |
| **Proprieties:** Sys, CFG | | | |

**Description:**

It defined the Transition time between the switching of the start contactors of the motor. Used in the change of direction on the Reverter Starting mode (P202 = 3), in the conversion from star to delta on the Star-Delta starting mode (P202 = 4) and in the change of speed for the Dahlander Starting (P202 = 5) and Two Windings (P202 = 6) modes.

### 6.4.4.1 Connection Diagram – Reversing Starter

The scheme on figure 6.9 shows an example of the use of the SRW 01 on the Reverter Starting operation mode with drive through digital inputs (P229 = 0) at 24 Vdc using three wires control logic (pushbuttons) (P230 = 1).

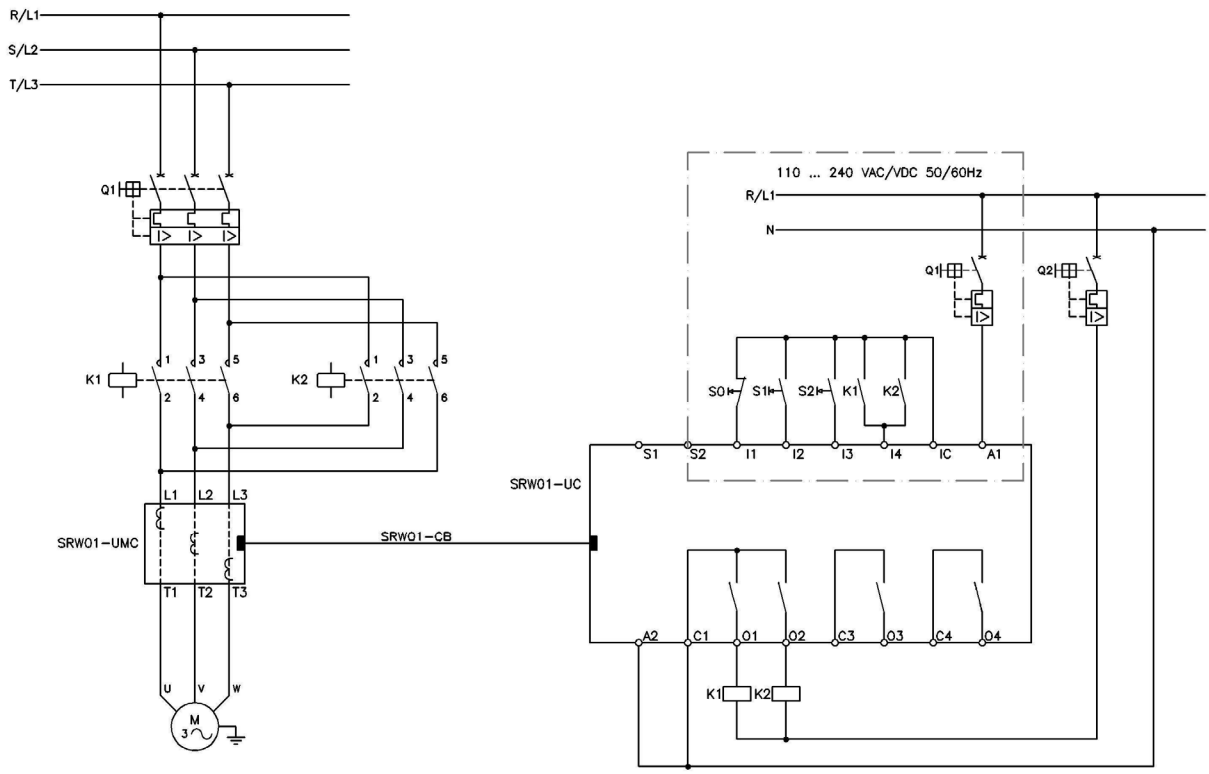
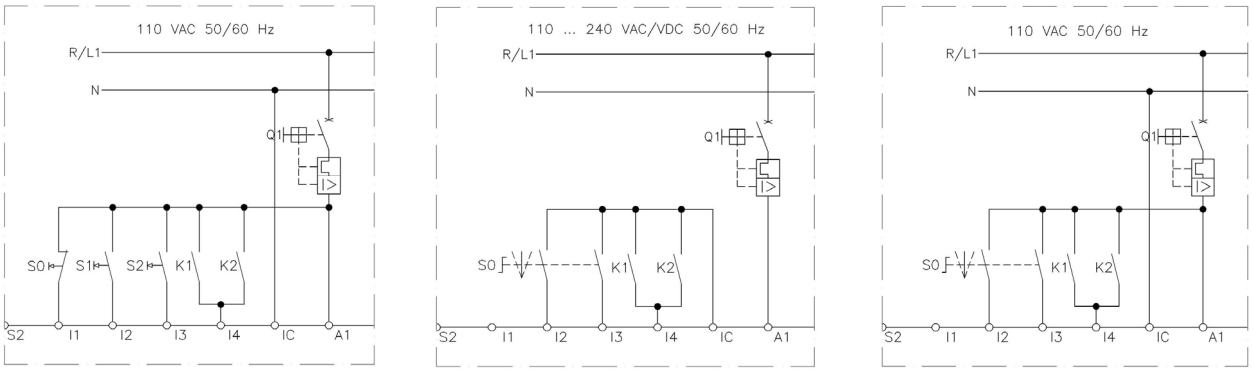



***Figure 6.9:*** *Connection scheme for the Reverter Starting Operation Mode using digital inputs at 24 Vdc and driven by pushbuttons (P230 = 1)*

The modification of the scheme for the control unit with digital inputs at 110 Vac is shown on figure 6.10 **(a)**.

The modifications of the scheme for drive through the digital inputs (P229 = 0) at 24 Vdc, and at 110 Vac using two wires (switch) control logic (P230 = 0) are shown on figure 6.10 **(b)** and **(c)**.




(a) (b) (c)

***Figure 6.10 (a):*** *Detail modification for drive using digital inputs at 110 Vac and driven by pushbuttons (P230 = 1)*

***(b):*** *Detail modification for drive using digital inputs at 24 Vdc and*

***(c):*** *Digital inputs at 110 Vac both with switch drive (P230 = 0)*

### 6.4.4.2 Operation Diagram – Reversing Starter

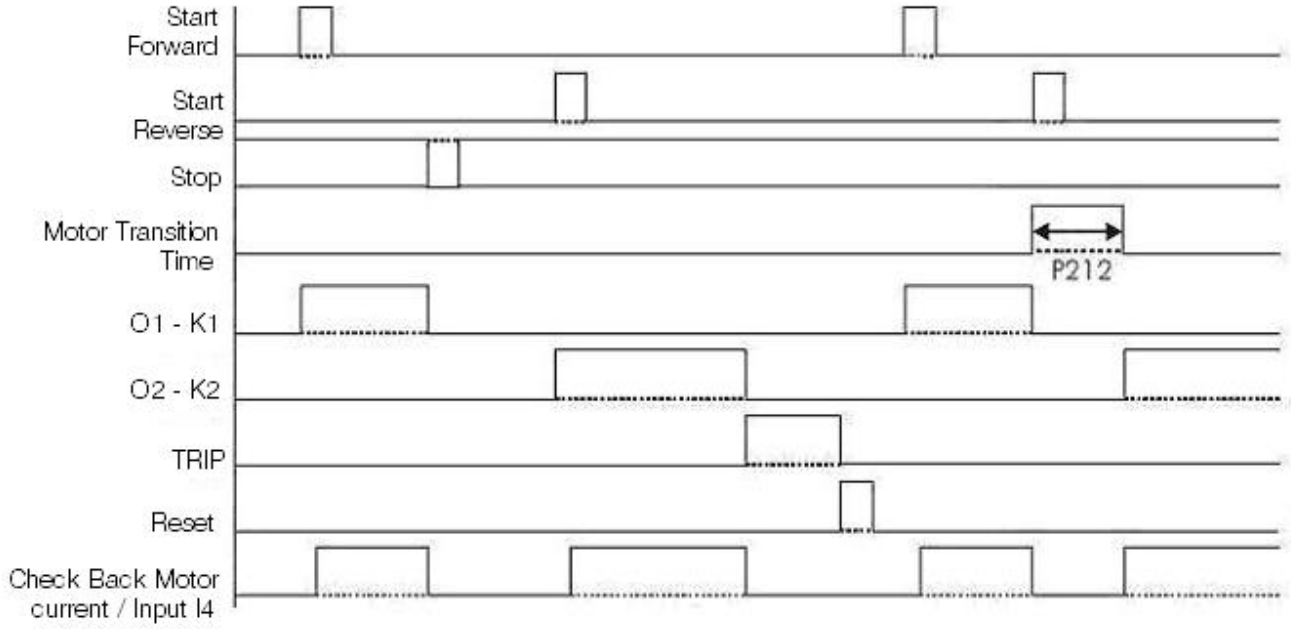



***Figure 6.11:*** *Operation diagram for the Reversing Starter Operation Mode*

### 6.4.5 Star-Delta Starter

In this mode a star-delta starter for three-phase motors is configured. The digital outputs O1 and O3 are reserved for the operation of the motor in the star connection and the digital outputs O1 and O2 for the operation of the motor in the delta connection. The digital outputs O4 can be used according to the user's needs.

In case of a TRIP, the digital outputs O1, O2 and O3 switch off the starting contactors, thus stopping the motor.

Digital inputs and outputs are configured as per table 6.6.

***Table 6.6:*** *Configuration of the digital inputs and outputs for the Star-Delta Startinf operation mode*

| Digital Inputs /Outputs | Function | |
|---|---|---|
| | Control Logic 3 wires (Pushbuttons) | Control Logic 2 wires (Switch) |
| I1 | Stop Pushbutton | Free |
| I2 | Start Pushbutton | Start/Stop Switch |
| I3 (*) | Check Back K1-K2 | |
| I4 (*) | Check Back K1-K3 | |
| O1 | K1 Contactor Operation | |
| O2 | K2 Delta Contactor Operation | |
| O3 | K3 – Star Contactor Operation | |
| O4 | Ladder | |

**(*)** Adjust P208 according to the application.

The changeover time from star to delta is configured through the parameter P210.

**P210 – Star/Delta Time**

| | | | |
|---|---|---|---|
| **Adjustable Range:** | 1 to 99 s | **Factory Setting:** | 25 s |
| **Proprieties:** Sys, CFG | | | |

**Description:**

It defines the time delay for the changeover from star to delta.

#### 6.4.5.1 Connection Diagram – Star-Delta Starter

The scheme on figure 6.12 shows an example of the use of the SRW 01 on the Star-Delta Starting operation mode with drive through digital inputs (P229 = 0) at 24 Vdc using three wires (pushbuttons) control logic (P230 = 1).

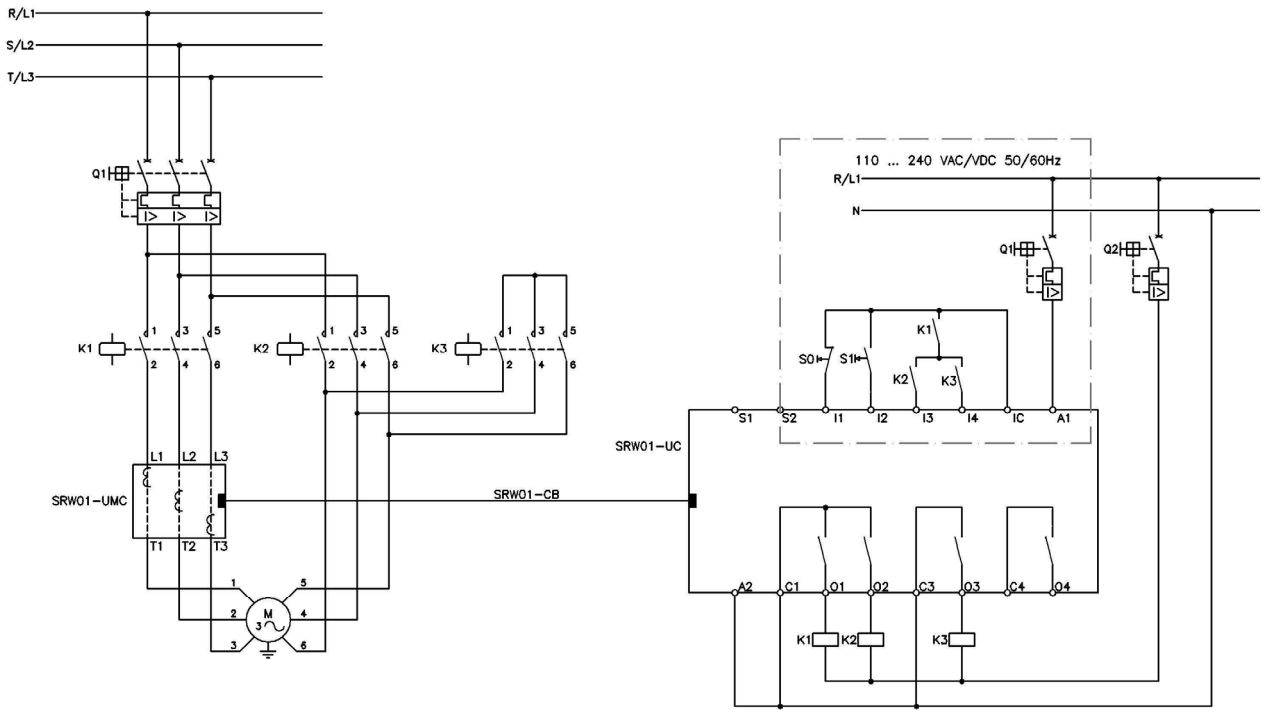
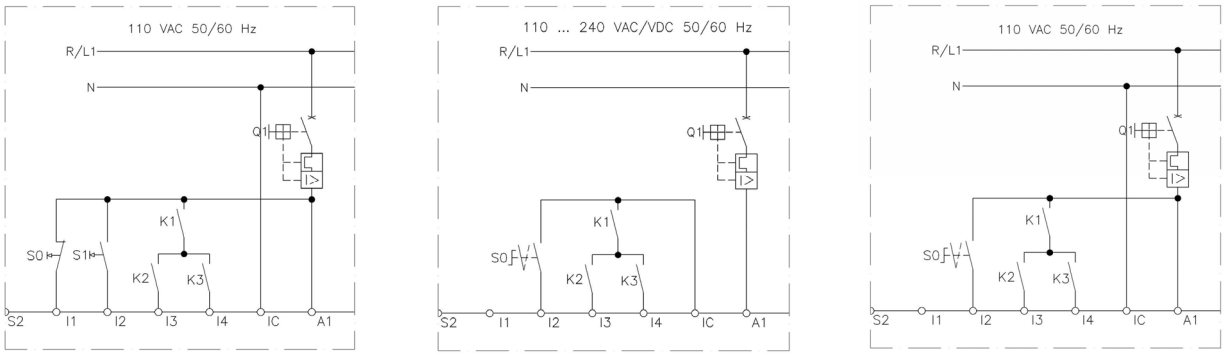



***Figure 6.12:*** *Connection scheme for the Star-Delta Starting Operation Mode –using digital inputs at 24 Vdc and driven by pushbuttons (P230=1)*

The modification of the scheme for the control unit with digital inputs at 110 Vac is shown on figure 6.13 **(a)**.
The modifications of the scheme for drive through the digital inputs (P229 = 0) at 24 Vdc, and at 110 Vac using two wires (switch) control logic (P230 = 0) are shown on figure 6.13 **(b)** and **(c)**.




**(a)** **(b)** **(c)**

***Figure 6.13 (a):*** *Detail modification for drive using digital inputs at 110 Vac and driven by pushbuttons (P230 = 1)*
***(b):*** *Detail modification for drive using digital inputs at 24 Vdc and*
***(c)****: Digital inputs at 110 Vac both with switch drive (P230 = 0)*

#### 6.4.5.2 Operation Diagram – Star-Delta Starter

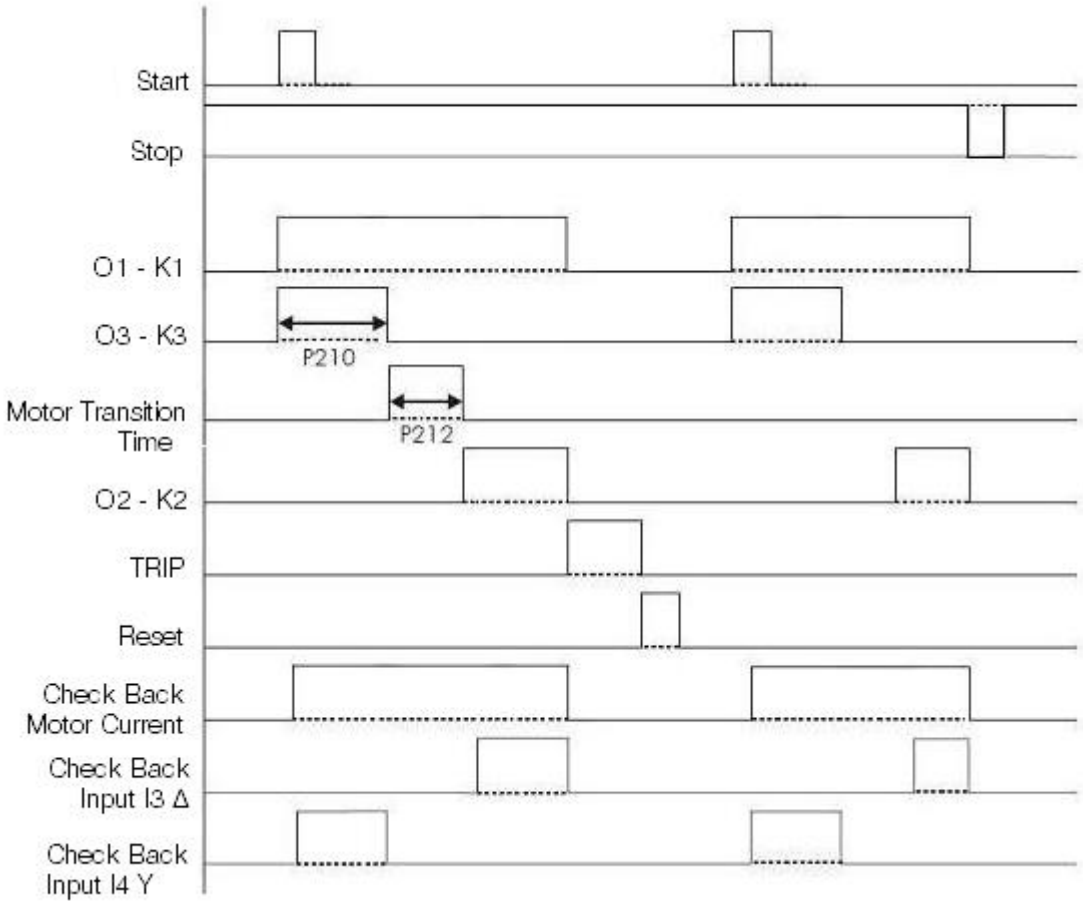



***Figure 6.14:*** *Operation diagram for the Star-Delta Starter Operation Mode*

### 6.4.6 Dahlander Starter

In this mode a Dahlander starter for three-phase motors is configured. The digital output O1 is reserved for running the motor at the low speed. The digital outputs O2 and O3 are reserved for running the motor at the high speed. The digital output O4 can be used according to the user's needs.

In case of a TRIP, the digital outputs O1, O2 and O3 switch off the starting contactors, thus stopping the motor.

Digital inputs and outputs are configured as per table 6.7.

***Table 6.7:*** *Configuration of the digital inputs and outputs for the Dahlander Starting operation mode*

| Digital Inputs /Outputs | Function | |
|---|---|---|
| | **Control Logic 3 wires (Pushbuttons)** | **Control Logic 2 wires (Switch)** |
| I1 | Stop Pushbutton | Free |
| I2 | Start High Speed Pushbutton | Start High Speed/ Stop Switch |
| I3 | Start Low Speed Pushbutton | Start Low Speed/Stop Switch |
| I4 (*) | Check Back | |
| O1 | K1 - Low Speed Contactor Operation | |
| O2 | K2 - High Speed Contactor Operation | |
| O3 | K3 - High Speed Contactor Operation | |
| O4 | Ladder | |

**(*)** Adjust P208 according to the application.

**NOTE!**

In the Dahlander Starter mode the parameter P401 must be programmed with the low speed nominal current and P402 must be programmed with the high speed nominal current.

**NOTE!**

The motor speed can be changed with the motor switched on, after the time defined in P212 has elapsed.

#### 6.4.6.1 Connection Diagram – Dahlander Starter

The scheme on Figure 6.15 shows an example of the use of the SRW 01 on the Dahlander Starting operation mode with drive through digital inputs (P229 = 0) at 24 Vdc using three wires (pushbuttons) control logic (P230 = 1).

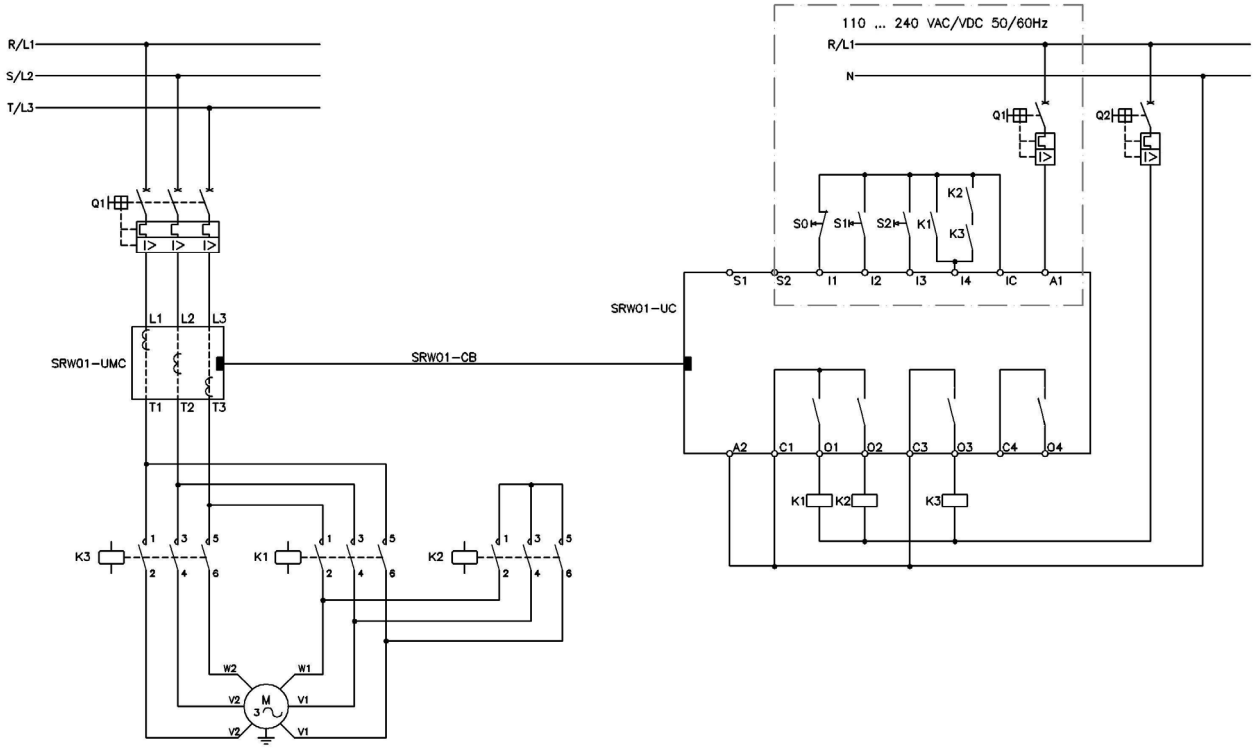
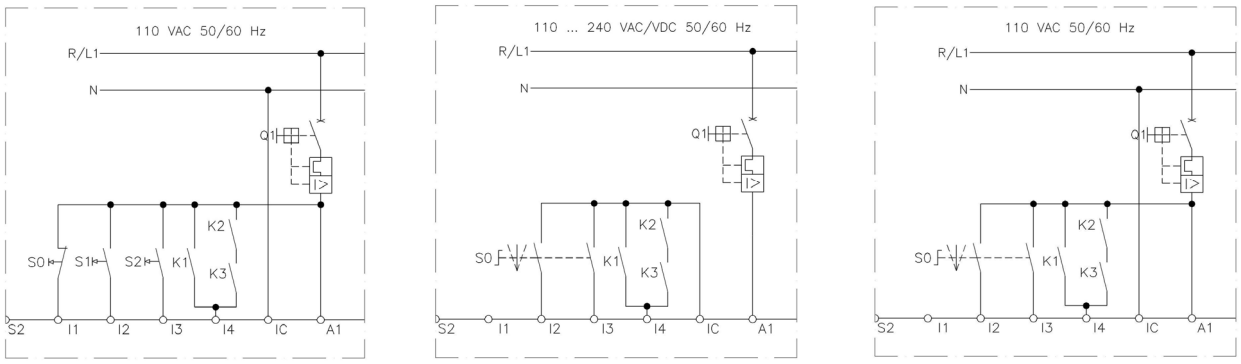



***Figure 6.15:*** *Connection scheme for the Dahlander Starting Operation Mode using digital inputs at 24 Vdc and driven by pushbuttons (P230 = 1)*

The modification of the scheme for the control unit with digital inputs at 110 Vac is shown on figure 6.16 **(a)**.

The modifications of the scheme for drive through the digital inputs (P229 = 0) at 24 Vdc, and at 110 Vac using two wires (switch) control logic (P230 = 0) are shown on figure 6.16 **(b)** and **(c)**.




**(a)** **(b)** **(c)**

***Figure 6.16 (a):*** *Detail modification for drive using digital inputs at 110 Vac and driven by pushbuttons (P230 = 1)*

***(b):*** *Detail modification for drive using digital inputs at 24 Vdc and*

***(c)****: Digital inputs at 110 Vac both with switch drive (P230 = 0)*

### 6.4.6.2 Operation Diagram – Dahlander Starter

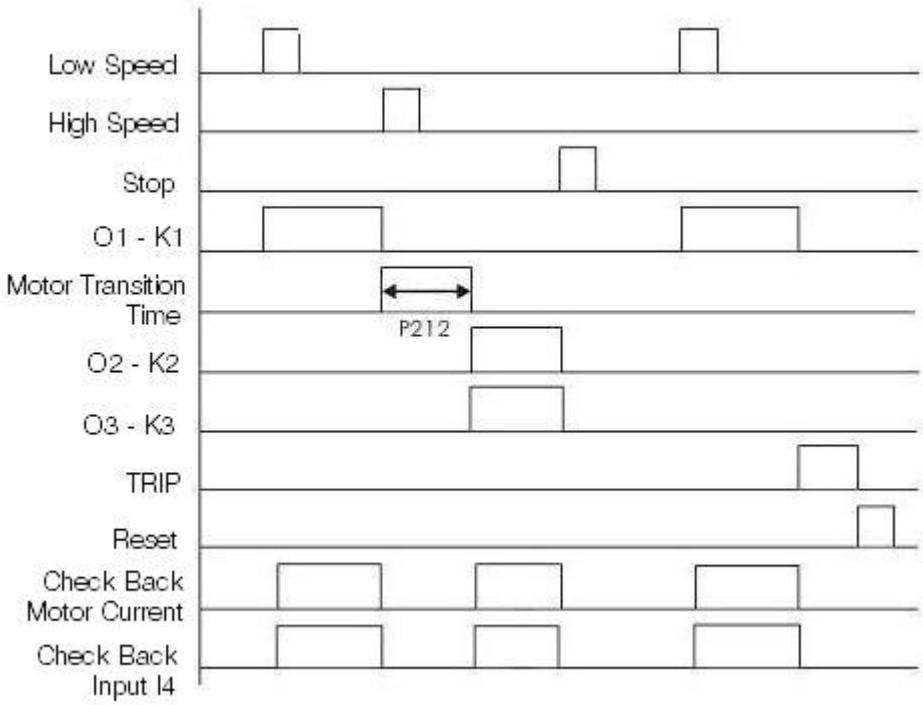



***Figure 6.17:*** *Operation diagram for the Dahlander Starter Operation Mode*

### 6.4.7 Pole Changing Starter

In this mode a Pole changing starter for three-phase motors with two windings is configured. The digital output O1 is reserved for running the motor at the low speed. The digital output O2 is reserved for running the motor at the high speed. The digital outputs O3 and O4 can be used according to the customer's needs.

In case of a TRIP, the digital outputs O1 and O2 switch off the starting contactors, thus stopping the motor.

Digital inputs and outputs are configured as per table 6.8.

***Table 6.8:*** *Configuration of the digital inputs and outputs for the Two Winding Starting operation mode*

| Digital Inputs /Outputs | Function | |
|---|---|---|
| | **Control Logic 3 wires (Pushbuttons)** | **Control Logic 2 wires (Switch)** |
| I1 | Stop Pushbutton | Free |
| I2 | Start High Speed Pushbutton | Start High Speed/ Stop Switch |
| I3 | Start Low Speed Pushbutton | Start Low Speed/Stop Switch |
| I4 (**) | Check Back | |
| O1 | K2 - Low Speed Contactor Operation | |
| O2 | K1 - High Speed Contactor Operation | |
| O3 | Ladder | |
| O4 | Ladder | |

**(*)** Adjust P208 according to the application.

**NOTE!**

In the Pole Changing Starter mode the parameter P401 must be programmed with the low speed nominal current and P402 must be programmed with the high speed nominal current.

**NOTE!**

The motor speed can be changed with the motor switched on, after the time defined in P212 has elapsed.

### 6.4.7.1 Connection Diagram – Pole Changing Starter

The connection scheme on figure 6.18 shows an example of the use of the SRW 01 on the Two Winding Starting operation mode with drive through digital inputs (P229 = 0) at 24 Vdc using three wires (pushbuttons) control logic (P230 = 1).

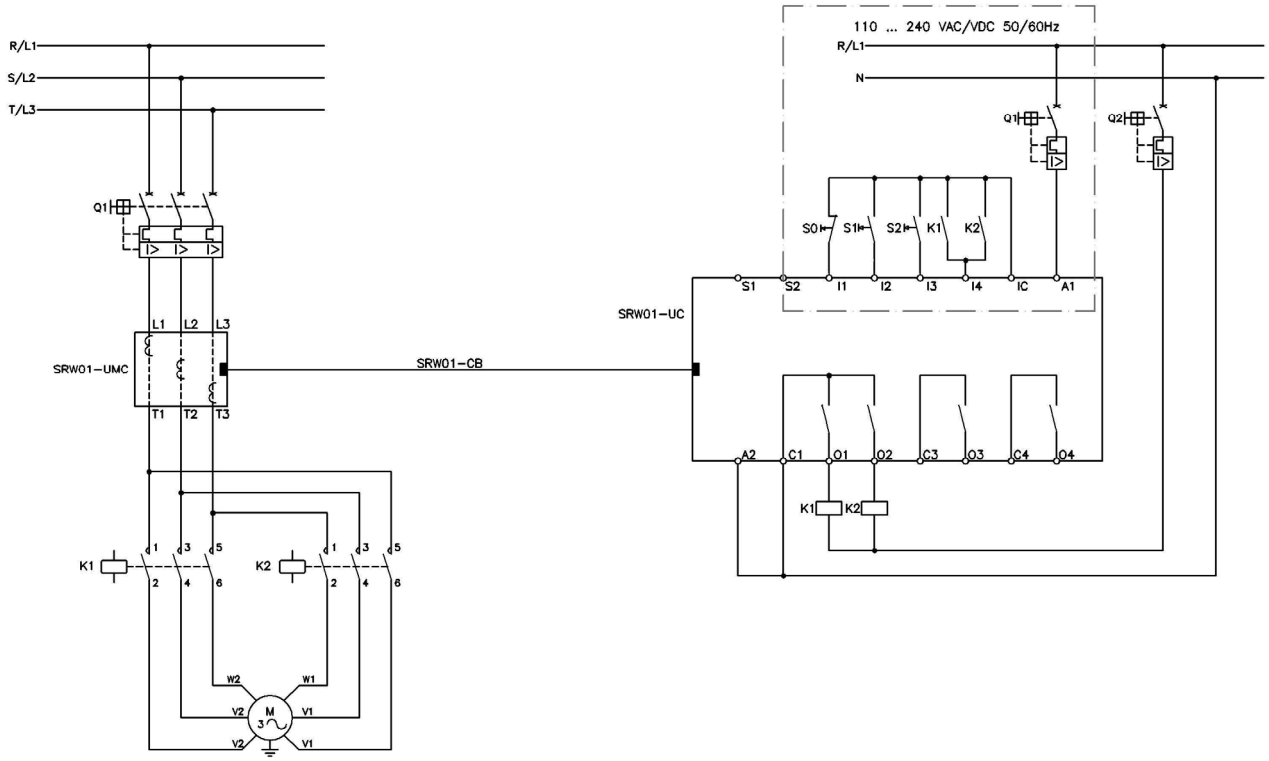
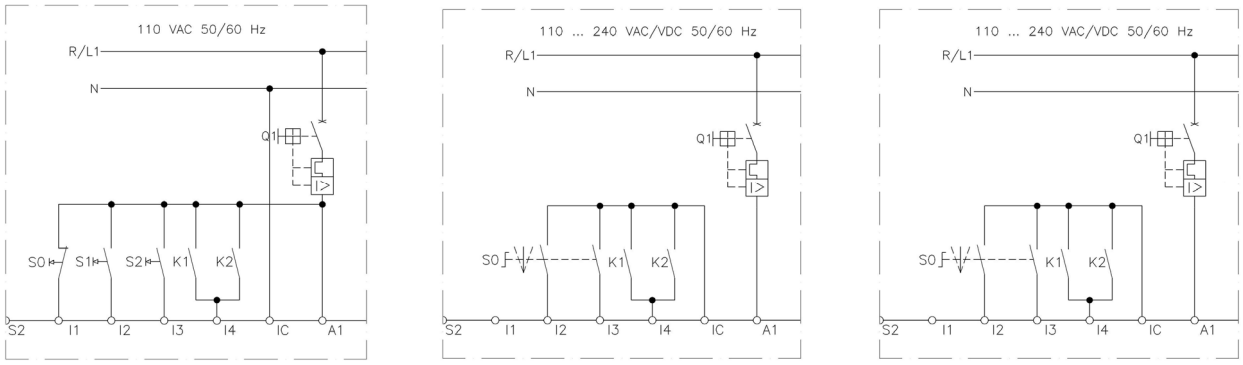



***Figure 6.18:*** *Connection scheme for the Two Windings Starting Operation Mode using digital inputs at 24 Vdc and driven by pushbuttons (P230=1)*

The modification of the scheme for the control unit with digital inputs at 110 Vac is shown on figure 6.19 **(a)**.
The modifications of the scheme for drive through the digital inputs (P229 = 0) at 24 Vdc, and at 110 Vac using two wires (switch) control logic (P230 = 0) are shown on figure 6.19 **(b)** and **(c)**.




(a) (b) (c)

***Figure 6.19 (a):*** *Detail modification for drive using digital inputs at 110 Vac and driven by pushbuttons (P230 = 1)*

***(b):*** *Detail modification for drive using digital inputs at 24 Vdc and*

***(c):*** *Digital inputs at 110 Vac both with switch drive (P230 = 0)*

### 6.4.7.2 Operation Diagram – Pole Changing Starter

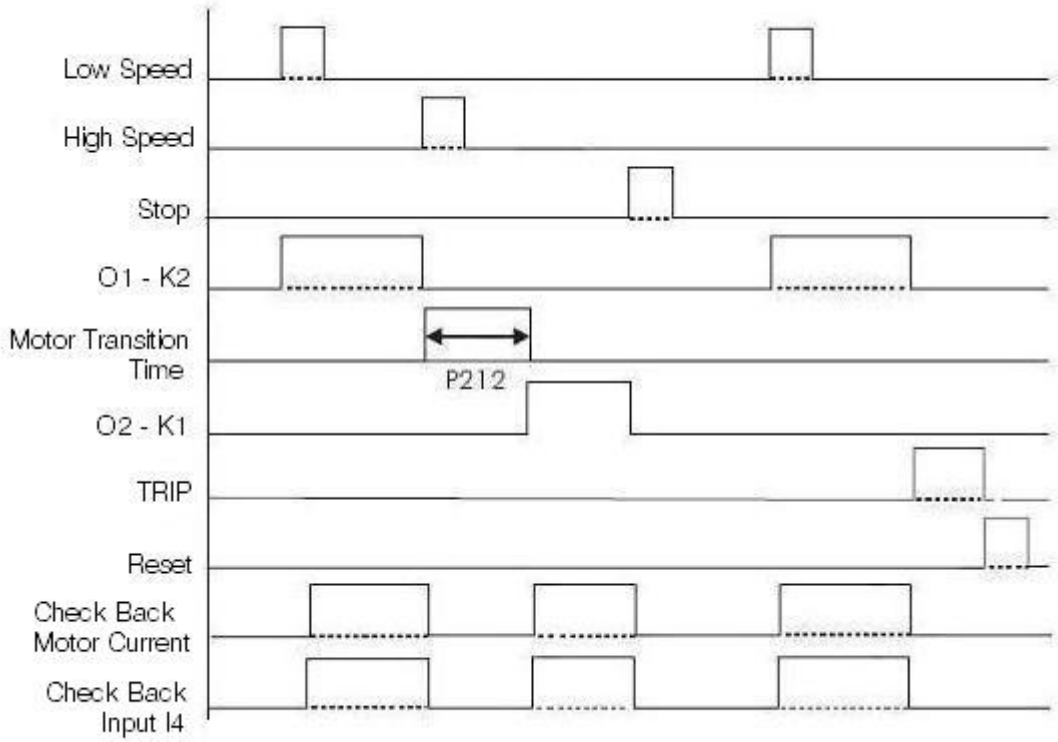



***Figure 6.20:*** *Operation diagram for the Pole Changing Starter Operation Mode*

### 6.4.8 PLC Mode

In this operation mode the SRW 01 does not use the UMC, so only the PTC thermal protection (P644) can be abled for the SRW01-PTC and the Earth Leakage (P631) protection for the SRW01-RCD. In this mode the SRW 01 operates similarly to a PLC, allowing the user to develop its application using ladder language, through the WLP software. It can also be used as a remote I/O expansion without a ladder program.

The digital inputs and outputs can be used according to the need of the application, operated in a remote way and configured as per table 6.9.

***Table 6.9:*** *Configuration of the digital inputs and outputs for the PLC operation mode*

| Digital Inputs /Outputs | Function |
|---|---|
| I1 | Free |
| I2 | Free |
| I3 | Free |
| I4 | Free |
| O1 | Ladder |
| O2 | Ladder |
| O3 | Ladder |
| O4 | Ladder |

**ATTENTION!**

In this operation mode, only the PTC thermal protection (P644) can be abled for the SRW01-PTC and the Earth Leakage (P631) protection for the SRW01-RCD.

In the PLC mode, if an Error or Trip occurs the SRW 01 will not automatically disconnect its outputs. This protection must be programmed by the user using the Error and Trip bits on the Ladder logics of the SRW 01.

**NOTE!**

Check on the nameplate or on the warning tag of the product which is the model of the control unit acquired:

- PTC protection (SRW01-PTC) or
- Earth Leakage (SRW01-RCD).

#### 6.4.8.1 Connection Diagram – PLC

The scheme on figure 6.21 shows an example of the use of the SRW 01 on the PLC operation mode with drive through digital inputs at 24 Vdc.

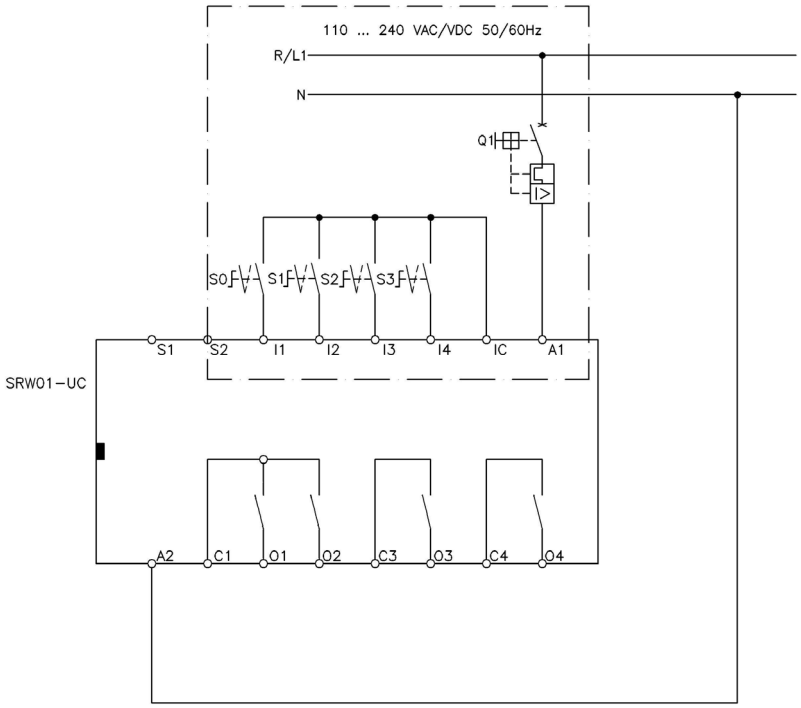



***Figure 6.21:*** *Connection scheme for the PLC Operation Mode using digital inputs at 24 Vdc..*

The modification of the scheme for the control unit with digital inputs at 110 Vac is shown on figure 6.22.

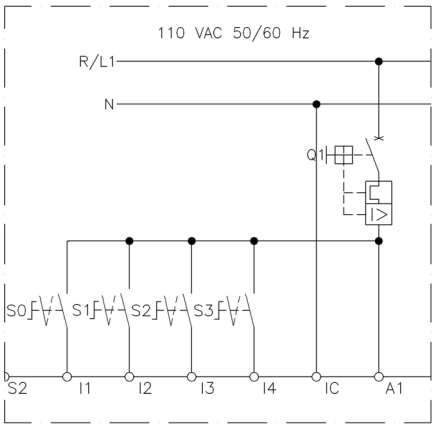



***Figure 6.22:*** *Detail modification for drive using digital inputs at 110 Vac*

## 6.5 MOTOR CONFIGURATION

In order to achieve an efficient motor protection, it is necessary to configure the parameters correctly according to the motor data.

**P295 – Current Measurement Unit (UMC)**

| | | |
|---|---|---|
| **Adjustable Range:** | 0 = UMC0 (0.25 – 2.5 A)<br>1 = UMC1 (0.5 – 5 A)<br>2 = UMC2 (1.5 – 12.5 A)<br>3 = UMC3 (2.5– 25 A)<br>4 = UMC4 (12.5 – 125 A)<br>5 = UMC5 (42 – 420 A)<br>6 = UMC6 (84 – 840 A) | **Factory Setting:** 1 |

**Proprieties:** Sys, CFG

**Description:**

It selects the Current Measurement Unit (UMC) that will be connected to the SRW 01. For more information refer to the section 4.2 of this addendum.

**NOTE!**

The Control Unit sends out a signal through the STATUS Led (Red) and message "E0082" on the HMI if the rated current of the motor (P401/P402) is out of the current measuring unit range. In this condition, it does not allow the motor to be driven while there is an error condition and automatically leaves the error condition when the setting is valid. There is no need for the reset control. A signal is sent out through the STATUS Led (Green) and the message "E0082" on the HMI is cleaned.

**NOTE!**

On the Firmware versions 1.34 and earlier, parameter P295 was defined as TC Current.

## 6.6 COMMUNICATION NETWORK CONFIGURATION

### 6.6.1 Modbus-RTU

Parameters for the configuration and operation of the Modbus-RTU interface.

**P314 –Serial Watchdog**

**P725 – Communication Module Address**

**P726 – DeviceNet/Modbus Baud Rate**

**P770 – Reading Programmable Parameter #1**

**P771 – Reading Programmable Parameter #2**

**P772 – Reading Programmable Parameter #3**

**P773 – Reading Programmable Parameter #4**

**P774 – Reading Programmable Parameter #5**

**P775 – Reading Programmable Parameter #6**

**P780 – Value of the Reading Programmable Parameter #1**

**P781 – Value of the Reading Programmable Parameter #2**

**P782 – Value of the Reading Programmable Parameter #3**

**P783 – Value of the Reading Programmable Parameter #4**

**P784 – Value of the Reading Programmable Parameter #5**

**P785 – Value of the Reading Programmable Parameter #6**

In order to get more information, refer to the Modbus-RTU Communication Manual, supplied in electronic format on the CD-ROM that comes with the product, or obtained from the WEG website – www.weg.net .

## 6.7 PROTECTION CONFIGURATION PARAMETERS

The SRW 01 provides the following protections:

- Overload;
- Phase Loss;
- Current Imbalance;
- Overcurrent – configured for locked rotor protection;
- Undercurrent;
- Earth Fault;
- PTC thermal protection;
- Frequency out of range;
- Earth Leakage;
- External Fault.

**NOTE!**

- PTC protection available only on version SRW 01-PTC.
- Earth leakage protection is available only on version SRW 01-RCD.
- Check the nameplate or the warning tag on the product to know which model of the control unit was acquired.

### 6.7.1 External Fault

The external Fault protection can be used to monitor the state of an external equipment (for example, a limit switch) through a signal on a digital input. Monitoring can be done regardless of the state of the motor or only when it is in operation.

**P609 – External Fault Time**

| | | | |
|---|---|---|---|
| **Adjustable Range:** | 0 = Disabled<br>1 to 99 = Enabled | **Factory Setting:** | 0 s |
| **Proprieties:** Sys, rw | | | |

**Description:**

It ables or disables the external Fault protection.

**P610 – External Fault Monitoring of protection**

| | | | |
|---|---|---|---|
| **Adjustable Range:** | 0 = Always<br>1 = Only when the motor is running | **Factory Setting:** | 0 |
| **Proprieties:** Sys, rw | | | |

**Description:**

It defines in which operation state the external Fault protection is verified.

If P610 = 0, the protection is active regardless whether the motor is operating or stopped.

If P610 = 1, the protection is only active when the motor is operating.

**P611 – External Fault Signal**

| | | | |
|---|---|---|---|
| **Adjustable Range:** | 0 = Digital Input I1<br>1 = Digital Input I2<br>2 = Digital Input I3<br>3 = Digital Input I4 | **Factory Setting:** | 3 |
| **Proprieties:** Sys, rw | | | |

**Description:**

It defines which the digital input that corresponds to the external Fault signal is.

**P612 – External Fault Signal Logic**

| | | |
|---|---|---|
| **Adjustable Range:** | 0 = Normally Closed (NC)<br>1 = Normally Open (NO) | **Factory Setting:** 1 |
| **Proprieties:** Sys, rw | | |

**Description:**

It defines the logic of the external Fault drive signal.

If P612 = 0, normally closed, active in logic level 0 (zero).

If P612 = 1, normally open, active in logic level 1.

**P613 – External Fault Protection Action**

| | | |
|---|---|---|
| **Adjustable Range:** | 0 = Alarm<br>1 = Switch off (TRIP) | **Factory Setting:** 1 |
| **Proprieties:** Sys, rw | | |

**Description:**

It defines the protective action by external Fault.

### 6.7.2 PTC Thermal Protection

The PTC thermal protection uses PTC sensors installed inside the motor for its protection.

Actuation range:

- Actuation: value higher than 3.4 kΩ;
- Reset: value lower than 1.6 kΩ.

The PTC protection presents the following alarms:

- Shorted PTC sensor: The SRW 01 switches off the motor and signalizes ERROR on the Status LED and the message “E0034” on the HMI;
- Open PTC sensor: The SRW 01 switches off the motor and signalizes ERROR on the Status LED and the message “E0035” on the HMI.

**P644 – PTC Protection**

| | | |
|---|---|---|
| **Adjustable Range:** | 0 = Disabled<br>1 = Enabled | **Factory Setting:** 0 s |
| **Proprieties:** Sys, rw | | |

**Description:**

It enables or disables the PTC protection.

**P645 – PTC Protection Action**

| | | |
|---|---|---|
| **Adjustable Range:** | 0 = Alarm<br>1 = Switch off (TRIP) | **Factory Setting:** 1 |
| **Proprieties:** Sys, rw | | |

**Description:**

It defines the action of the PTC protection.

**NOTE!**

The shorted PTC alarm is activated when the sensor resistance added to the one of the cables, is lower than 100 Ω. The table 6.10 informs the cross section and the maximum length of the cables, in order to assure shorted sensor detection.

***Table 6.10:*** *Considerations for PTC sensor short-circuit detection*

| Cable Cross Section | Maximum distance with short-circuit detection |
|---|---|
| 2.5 $mm^2$ | 2 x 250 m (820.2 ft) |
| 1.5 $mm^2$ | 2 X 150 m (492.1 ft) |
| 0.5 $mm^2$ | 2 x 50 m (164 ft) |

### 6.7.3 RESET Button

The reset button placed on the front part of the control unit allows the user to carry out the following functions, depending on the state of the SRW 01:

- Reset Function: in case of TRIP, alarm, error or fault;
- Trip Test Function: in normal operation.

#### 6.7.3.1 Reset

If the Reset button is pressed when the relay is in the TRIP, alarm, error or fault state due to some fault on the motor or on the SRW 01, the SRW 01 must return to normal operation since the cause of the fault is not present anymore.

**NOTE!**

The reset button does not reset the thermal image, for that purpose one must use the cooling time.

**P601 – Reset Selection**

| | | | |
|---|---|---|---|
| **Adjustable Range:** | 0 = Without Local Reset<br>1 = Front Button<br>2 = RESET key (HMI)<br>3 = Digital Input I3<br>4 = Digital Input I4 | **Factory Setting:** | 1 |
| **Proprieties:** Sys, rw | | | |

**Description:**

It selects the origin of the SRW 01 reset command.

**NOTE!**

The reset can be performed via Ladder or Fieldbus for any P601 adjustment.

### 6.7.3.2 Trip Test

The front Reset button allows the user to check the correct operation:

- Of the NET, TRIP and STATUS Leds placed on the front part of the Control Unit;
- Of the digital output that drives the motor, one or more outputs can be driven depending on the Operation Mode (P202) on item 6.3 of this addendum.

***Table 6.11:*** *Function stage of Test Trip*

| Normal Operation: Leds and output (s) | | Motor OFF | Motor ON |
|---|---|---|---|
| First stage: Reset Button pressed between 1 s - 3 s | | | |
| NET led | Signaling as per table 7.1 | Red/Green Flash | Red/Green Flash |
| Led STATUS | Green | Red | Red |
| TRIP led | Green | Red | Red |
| Output(s) | Unchanged | Unchanged | Unchanged |
| Second stage: Reset Button pressed between 3 s - 5 s | | | |
| Led NET | Signaling as per table 7.1 | Signaling as per table 7.1 | Signaling as per table 7.1 |
| Led STATUS | Green | Green | Green |
| Led TRIP | Green | Red Flashlight | Red intermittent Flash |
| Saída(s) | Unchanged | Unchanged | Unchanged |
| Third stage: Reset Button pressed > 5 s | | | |
| Led NET | Signaling as per table 7.1 | Signaling as per table 7.1 | Signaling as per table 7.1 |
| Led STATUS | Green | Red Flashlight | Red Flashlight |
| Led TRIP | Green | Red Flashlight | Red Flashlight |
| Output(s) | Changed, switch OFF (TRIP) | Changed, switch OFF (TRIP) | Changed, switch OFF (TRIP) |

If the reset button placed on the front part of the Control Unit remains pressed between1 to 3 s, the verification of the NET, TRIP and STATUS leds is made. If during this stage the HMI is connected to the Control Unit, it will show on the display  and change the state of the Leds near the keys  which indicate the direction of the rotation/speed of the motor and  which indicate the operation mode of the SRW 01 Local/Remote.

If the button remains pressed from 3 to 5s, the TRIP Led will send out a signal that it will enter the next stage of the test simulating a TRIP state if the time surpasses 5 s and opening the output(s) that drive(s) the motor (according to operation Mode - P202), signaling ERROR on the STATUS Led and the message “E0087” on the HMI.

**NOTE!**

Check the correct operation of the NET, TRIP and STATUS Leds, display of the HMI and contactor of the digital output(s) periodically.

**NOTE!**

The Trip Test Function can be disabled using parameter P602. Activation when the motor is operating will disconnect it if the third stage of the test is started.

**P602 – Function Test/Reset Button**

| | | | |
|---|---|---|---|
| **Adjustable Range:** | 0 = Disabled<br>1 = Enabled | **Factory Setting:** | 1 |
| **Proprieties:** Sys, rw | | | |

**Description:**

It ables or disables the trip test function through the reset button placed on the front of the control unit.

### 6.7.4 Earth Leakage

The IEC 60755 technical report defines the terms “*earth fault current”* as the current that flows to the earth due to an insulation fault; “e*arth leakage current”* is the current that flows from the live parts of an installation to the earth in the absence of insulation fault; and “r*esidual current”* is the vectorial sum of the instantaneous current values flowing through the power circuit of the installation.

The SRW 01-RCD has the protection function against earth leakage currents when used with the earth leakage sensors (ELS). The protection action can be configured for alarm or trip. The sensors must be assembled separately from the relay and placed at a maximum distance of ten meters from it. The earth leakage protection allows to detect faults on the installation and/or electrical deterioration of equipment measuring residual currents between 300 mA and 5 A. The time for the protection to actuate can also be configured from 0.1 s up to 25.0 s.

**ATTENTION!**

This earth leakage protection system has the sole purpose to protect installations. IT IS NOT FOR THE PURPOSE OF PROTECTING PEOPLE.

It is expected for a fuse/circuit breaker, the upstream on the installation, with appropriate interruption capacity to perform for residual currents with high magnitudes, supposedly indicating currents circulating on the main circuit above the interruption capacity of the contactor. For this, the SRW 01-RCD offers a function that inhibits the opening of the relay when the residual current is larger than 10 A (for further information see the description of the function on item 6.6.4.3).

There are several situations during the start of electric induction motors that can indicate false presence of earth leakage on the sensor. This effect is intrinsic of certain applications and, in most cases, temporary and lasts for a short time. The SRW 01-RCD has a function that inhibits the relay trip during the start of the motor and the inhibition time of the trip can be configured by the user according to the configured application. This function allows reducing the risks of nuisance trips (for further information see the description of the function on item 6.6.4.2).

#### 6.7.4.1 Earth Leakage protection operation

The SRW 01-RCD offers a protection against earth leakage current on an installation (the earth leakage protection set on parameter P631) whenever a fault occurs when the earth leakage sensor (ELS) detects that there is a residual current larger than the current set on parameter P632 and the time is larger than that set on parameter P633. The protection can be configured for alarm or trip through parameter P634. The factory standard for the earth leakage protection is disabled.

**NOTE!**

If the Earth Leakage inhibition functions on the Start function (P635) or inhibition of the Trip in case of Short-Circuit (P637) are abled, the SRW 01-RCD will act according to the description of these functions.

**P631 – Earth Leakage Protection**

| | | |
|---|---|---|
| **Adjustable Range:** | 0 = Disabled<br>1 = Enabled | **Factory Setting:** 0 |
| **Proprieties:** Sys, rw | | |

**Description:**

It ables or disables the earth leakage protection.

**P632 – Earth Leakage Current Level Selection**

| | | |
|---|---|---|
| **Adjustable Range:** | 0 = 0.3 A<br>1 = 0.5 A<br>2 = 1 A<br>3 = 2 A<br>4 = 3 A<br>5 = 5 A | **Factory Setting:** 2 |
| **Proprieties:** Sys, rw | | |

**Description:**

It selects the earth leakage current.

**P633 – Earth Leakage Time**

| | | | |
|---|---|---|---|
| **Adjustable Range:** | 0.1 to 25.0 s | **Factory Setting:** | 0.5 s |
| **Proprieties:** | Sys, rw | | |

**Description:**

It defines the earth leakage current time to turn off the motor or to signal alarm, increment/decrement of 0.1s.

**P634 – Earth Leakage Protection Action**

| | | | |
|---|---|---|---|
| **Adjustable Range:** | 0 = Alarm<br>1 = Switch off (TRIP) | **Factory Setting:** | 1 |
| **Proprieties:** | Sys, rw | | |

**Description:**

It defines the action of earth leakage protection.

### 6.7.4.2 Inhibition of the Earth Leakage Protection at Starting

The SRW 01-RCD also offers a function that inhibits the earth leakage protection during motor start (P635) for a set time (P636), as long as the earth leakage protection (P631) and trip inhibition at the start (P635) are abled The factory standard of function P635 is disabled and the user can able it through the same parameter. The inhibition time of start can be set between 1 and 600s (standard 5 s) through parameter P636.

**P635 – Earth Leakage Start up Inhibit**

| | | | |
|---|---|---|---|
| **Adjustable Range:** | 0 = Disabled<br>1 = Enabled | **Factory Setting:** | 0 |
| **Proprieties:** | Sys, rw | | |

**Description:**

It ables or disables the inhibition of the earth leakage protection action during motor start.

**P636 – Earth Leakage Start up Time Inhibit**

| | | | |
|---|---|---|---|
| **Adjustable Range:** | 1 to 600 s | **Factory Setting:** | 5 s |
| **Proprieties:** | Sys, rw | | |

**Description:**

It defines the inhibition time of the earth leakage protection action during motor start, increment/decrement of 1 s.

**NOTE!**

The inhibition time of the earth leakage protection at the motor start begins to be counted whenever the measured motor current is higher than 15% of the rated current set on parameters P401 and/or P402 or the residual current detected by the earth leakage current sensor (ELS) (P037) is higher than 150 mA.

**NOTE!**

At motor start, if there is a residual current detected by the earth leakage current sensor (ELS), if the Earth Leakage protection (P631) and the Earth Leakage Protection Inhibition function at Start (P635) are abled, the actuation time of the relay will be the sum of the times set on parameters P633 and P636.

**NOTE!**

If the Earth Leakage Protection function at Start is abled (P635), the earth leakage protection will only start when the inhibition time of the Protection at Start (set on P636) expires.

#### 6.7.4.3 Trip Inhibition Function in Case of Short Circuit

The SRW 01-RCD also offers a trip inhibition function in case of short circuit (P637) as long as the earth leakage protection is abled on parameter P631. The level of short circuit current for this protection is fixed at 10 A and it cannot be set by the user. This function only has effect if the earth leakage protection action, configured on P634, is selected to Switch off (Trip).

If the residual current detected by the earth leakage sensor is higher than 10 A and the protection that inhibits the trip, when there is a short circuit condition, it abled on parameter P637, the SRW 01-RCD will generate the alarm "E0077" to indicate that the earth leakage current is in short circuit condition and it will not allow the SRW 01 to trip unless the earth leakage current reduces to a value lower than 10 A. The factory standard for this function is disabled.

**P637 – Earth Leakage Short circuit Trip Inhibit**

| | | | |
|---|---|---|---|
| **Adjustable Range:** | 0 = Disabled<br>1 = Enabled | **Factory Setting:** | 0 |
| **Proprieties:** Sys, rw | | | |

**Description:**

It ables or disables the trip inhibition in case of short circuit.

**ATTENTION!**

The Trip Test function described in item 6.6.3.2 of this addendum, makes it possible to verify the correct operation of the digital output (s), not verifying the flow of earth leakage current or default on the connection wiring between the earth leakage sensor (ELS) and the control unit (UC).

### 6.7.4.4 Verification of the Earth Leakage Current Measuring

It is recommended to check the correct operation of the system periodically by applying a known earth leakage current on the level defined on P632 through an earth leakage sensor and comparing it with that informed on P037. figure 6.23 shows a connection scheme for the test.

Resistor calculation "R":

$$R = \frac{V}{I}$$

Resistor power calculation "R"

$$P = R \cdot I^2$$

Calculation of error percentage between the circuit current ( $I$ ) and the current informed on parameter P037:

$$erro(\%) = \left| \frac{I - I_{P037}}{I} \right| \times 100$$

Current $I$ must satisfy the following condition:

$$0{,}3 \leq I \leq 5A$$

$V$ = Alternate supply source.

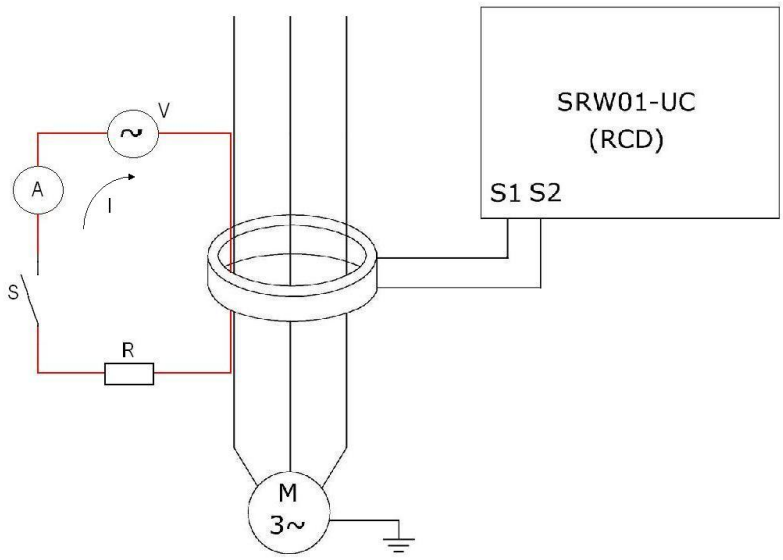



***Figure 6.23:*** *Connection scheme for circuit test of earth leakage current Measuring*

# 7 MONITORING

## 7.1 MONITORING PARAMETERS

The SRW 01 performs the monitoring of the following variables:

| Parameter (address) | Description | Range |
|---|---|---|
| **P006** | Relay Status (binary) | bit0 = Error<br>bit1 = TRIP<br>bit2 = Alarm/Fault<br>bit3 = Motor On<br>bit4 = Remote Mode |
| **P036** | Earth Leakage Percentage Current | 0 to 3334 % |
| **P037** | Earth Leakage TRUE RMS Current | 0.000 to 10.000 A |
| **P050** | Motor Thermal Protection | 0 to 250 % |
| **P069** | Number of Earth Leakage Trips | 0 to 65535 |
| **P070** | Number of External Fault Trips | 0 to 65535 |
| **P073** | TRIP Status 3 (binary) | bit0 = Earth Leakage<br>bit1 = External Fault<br>bit2 = Trip Test<br>bit3 = No Function |
| **P077** | Alarm Status 3 (binary) | bit0 = Earth Leakage<br>bit1 = External Fault<br>bit2 = No Function<br>bit3 = No Function |
| **P080** | General Trip Status | 0 to 65535 |
| **P081** | General Alarm Status | 0 to 65535 |

**P006 – Relay Status (binary)**

| | | |
|---|---|---|
| **Adjustable Range:** | bit0 = Erro<br>bit1 = Trip<br>bit2 = Alarm/Fault<br>bit3 = Motor On<br>bit4 = Remote Mode | **Factory Setting:** - |
| **Proprieties:** RO | | |

**Description:**

This parameter allows monitoring the several states of the relay.

E.g.: P006 = 24 = 11000b. It means that the SRW 01 is in Remote Mode and that the motor is running.

The Error and/or Trip bits can be used on the user's Ladder logic, on the Transparent and PLC operation modes for trip of the output in case some protections actuate.

**P036 – Earth Leakage Percentage Current**

| | | |
|---|---|---|
| **Adjustable Range:** | 0 to 3334 % | **Factory Setting:** - |
| **Proprieties:** RO | | |

**Description:**

It informs the percentage of earth leakage current in relation to the current level set on parameter P632, as long as the earth leakage protection is abled (P631 = 1). It is only available for the SRW01-RCD relay.

## P037 – Earth Leakage TRUE RMS Current

| | | | |
|---|---|---|---|
| **Adjustable Range:** | 0.000 to 10.000 A | **Factory Setting:** | - |
| Proprieties: RO | | | |

**Description:**

It informs the TRUE RMS earth leakage current through the earth leakage sensor as long as the earth leakage protection is abled (P631 = 1). It is only available for the SRW01-RCD relay.

## P050 – Motor Thermal Protection

| | | | |
|---|---|---|---|
| **Adjustable Range:** | 0 to 250 % | **Factory Setting:** | - |
| **Proprieties:** RO | | | |

**Description:**

It informs the output value of the thermal model in a scale from 0 to 250% used on the overload protection of the SRW 01, being that 250 is the actuation point of the thermal protection of the motor.

The value indicated on this parameter depends on the operation condition of the motor and how much time it is found on this condition, for example: Standstill, start and at full rating.

It also depends on the selected thermal class, rated power of the motor and duty factor of the motor.

An approximate value of 160 can be read, if the motor is operating at full rating for more than 2 hours with current equal to the nominal plus the duty factor (In x F.S. @ 2h).

## P069 – Number of Earth Leakage Trips

| | | | |
|---|---|---|---|
| **Adjustable Range:** | 0 to 65535 | **Factory Setting:** | - |
| **Proprieties:** RO | | | |

**Description:**

It informs the number of trips per earth leakage. It is only available for the SRW01-RCD relay.

## P070 – Number of External Fault Trips

| | | |
|---|---|---|
| **Adjustable Range:** | 0 to 65535 | **Factory Setting:** - |
| **Proprieties:** RO | | |

**Description:**

It informs the number of trips per external fault.

## P073 – TRIP Status 3 (binary)

| | | |
|---|---|---|
| **Adjustable Range:** | bit0 = Earth Leakage<br>bit1 = External Fault<br>bit2 = Trip Test<br>bit3 = No Function | **Factory Setting:** - |
| **Proprieties:** RO | | |

**Description:**

It indicates if any protection actuated with Trip.

Ex: P073 = 4 = 0100b. It means that the SRW 01 switched off (TRIP) the motor due to the Trip test actuation.

## P077 – Alarm Status 3 (binary)

| | | |
|---|---|---|
| **Adjustable Range:** | bit0 = Earth Leakage<br>bit1 = External Fault<br>bit2 = No Function<br>bit3 = No Function | **Factory Setting:** - |
| **Proprieties:** RO | | |

**Description:**

It indicates if any protection actuated indicating only an alarm, without switching off the motor.

Ex: P077 = 2 = 0010b. It means that the External Fault protection actuated, but because it was configured for alarm, the motor has not been stopped.

## P080 – General Trip Status

| | | |
|---|---|---|
| **Adjustable Range:** | 0 to 65535 | **Factory Setting:** - |
| **Proprieties:** RO | | |

**Description:**

It indicates if any protection actuated with Trip.

## P081 – General Alarm Status

| | | | |
|---|---|---|---|
| **Adjustable Range:** | 0 to 65535 | **Factory Setting:** | - |
| **Proprieties:** | RO | | |

**Description:**

It indicates if any protection actuated indicating only an alarm, without switching off the motor.

# 8 DIAGNOSIS

The error, alarm, trip and fault diagnoses can be done through the three SRW 01 status LEDs or via HMI messages.

## 8.1 DIAGNOSIS VIA LEDs

***Table 8.1:*** *SRW 01 Status via LEDs*

| LED | Signalization | Description |
|---|---|---|
| STATUS | Green | Relay is ready to use |
| | Flashing green | Fault – does not switch off the motor |
| | Flashing red | Error – switches off the motor |
| NET | According to the communication manual of each protocol | |
| TRIP | Green | Normal motor |
| | Flashing green | Alarm – does not switch off the motor |
| | Flashing red | Trip – switches off the motor |

## 8.2 DIAGNOSIS VIA HMI

***Table 8.2:*** *Error code*

| Error | Type | Action | Description |
|---|---|---|---|
| E0005 | Protection | Trip or Alarm | Overload |
| E0010 | System | Fault | Error Copy Function |
| E0015 | Protection | Trip or Alarm | Phase Loss |
| E0024 | System | Error | Digital output configuration error |
| E0025 | System | Error | Digital input configuration error |
| E0031(*) | HMI | Fault | HMI without communication |
| E0032 | Protection | Trip or Alarm | PTC protection |
| E0034 | System | Error | Shorted PTC |
| E0035 | System | Error | Open PTC |
| E0051 | System | Fault | Fault by saving program |
| E0055 | System | Fault | Program incompatible or out of the memory limits |
| E0056 | System | Fault | CRC error during user program transfer |
| E0061 | System | Fault | CAN interface BUS off error |
| E0063 | System | Fault | Transceiver without power supply error |
| E0064 | System | Fault | Idle DeviceNet Master |
| E0065 | Protection | Trip or Alarm | Undercurrent |
| E0066 | Protection | Trip or Alarm | Overcurrent |
| E0067 | System | Fault | DeviceNet I/O connections timeout |
| E0068 | System | Error or Fault | Profibus communication timeout |
| E0069 | System | Error or Fault | Profibus interface initialization error |
| E0070 | System | Error or Fault | Parameterization data error (Profibus) |
| E0071 | System | Error or Fault | Configuration data error (Profibus) |
| E0072 | System | Error or Fault | Clear mode (Profibus) |
| E0073 | Protection | Trip or Alarm | Earth fault |
| E0074 | Protection | Trip or Alarm | Current Imbalance |
| E0075 | Protection | Trip or Alarm | Frequency out of range |
| E0076 | Protection | Trip or Alarm | Earth Leakage |
| E0077 (**) | Protection | Error or Alarm | Earth Leakage: Inhibits Trip in case of short circuit |
| E0078 | System | Error | Check back error, verification of start control |
| E0079 | System | Error | Check back error, verification of stop control |
| E0080 | System | Error | Check back error, stop verification |
| E0081 | System | Error | Check back error, operation verification |
| E0082 | System | Error | Current programmed on P401 (and P402) out of the UMC range |
| E0085 | System | Error | Without communication with the UMC |
| E0086 | System | Error or Fault | Timeout on serial communication (Modbus) |
| E0087 | System | Trip | Trip Test |
| E0088 | Protection | Trip or Alarm | External Fault |

**(*)** HMI local error that is not registered in the SRW 01-UC.

**(**)** It signals error if the motor is OFF and does not allow driving it. If the motor is ON, it signals alarm.

# 9 TECHNICAL CHARACTERISTICS

| | | |
|---|---|---|
| GENERAL DATA | MOUNTING POSITION | ANY |
| | POLLUTION DEGREE (UL508) | 2 |
| | PROTECTION DEGREE (IEC 60529) | ■ Control Unit (UC): IP20<br>■ Current Measurement Unit (UMC):<br>- Without connection busbar: IP20<br>- With connection busbar: IP00<br>■ Human-Machine Interface (HMI): IP20<br>■ Earth Leakage Sensor (ELS): IP20 |
| | ALLOWED AMBIENT TEMPERATURE | ■ Operation: 0… +40 °C (32… +104 °F)<br>■ Storage and transportation: -25… +80 °C (-13… 176 °F) |
| | SHORT-CIRCUIT RATINGS (UL) | ■ Control Unit (UC): refer to the section 3.11 in this addendum.<br>■ Current Measurement Unit (UMC): refer to the section 3.11 in this addendum. |
| | TRIPPING CLASS (UL) | ■ Control Unit (UC): 10/20/30 Class<br>■ Current Measurement Unit (UMC): 10/20/30 Class |
| CONTROL UNIT (UC) | NOMINAL ISOLATION VOLTAGE Ui | ■ 300 V |
| | NOMINAL SUPPLY VOLTAGE Us | ■ 110...240 Vac/Vdc @ 50/60 Hz |
| | OPERATION RANGE | ■ 0.85 Us...1.10 Us |
| | CONSUMPTION | ■ 13 W |
| | NUMBER OF DIGITAL INPUTS | ■ 4 optically isolated inputs (24 Vdc or 110 Vac) |
| | NUMBER OF DIGITAL OUTPUTS | ■ 4 relay outputs |
| | MOTOR PROTECTION VIA – PTC | ■ TRIP level: > 3.4 kΩ;<br>■ Reset value: < 1.6 kΩ |
| | TERMINAL STRIPS | ■ Torque: 0.5 Nm - 4.5 lb.in<br>■ Conductor cross section:<br>- Stripped solid wire: 1 x (0.2 ... 2.5 $mm^2$); 1 x (26 ... 12 AWG)<br>- Stranded with/without wire end ferrules: 1 x (0.2 ... 2.5 $mm^2$); 1 x (26 ... 12 AWG)<br>■ Screws: M3 |
| | RESET BUTTON | ■ Error or fault reset – system<br>■ TRIP or alarm reset – protections<br>■ TRIP Test |
| CURRENT MEASUREMENT UNIT (UMC) | CURRENT RANGES | ■ 0.25...840 Aac |
| | INSULATION RATING Ui | ■ 690 Vac |
| | NOMINAL OPERATING VOLTAGE Ue | ■ IEC 60947-4-1: 690 Vac<br>■ UL 508: 600 Vac |
| | IMPULSE STRENGTH Uimp | ■ 6 kV |
| | FREQUENCY RANGE | ■ 50/60 Hz |
| | APPLICATION | ■ Single-phase and three-phase |
| | CABLE HOLE DIAMETERS | ■ UMC 1, 2 and 3: 8 mm (0.31 in)<br>■ UMC 4: 15 mm (0.59 in)<br>■ UMC 5: Busbar<br>■ UMC 6: 32 mm (1.26 in) or busbar |
| DIGITAL INPUTS | NUMBER OF DIGITAL INPUTS | ■ 4 inputs optically isolated ( 24 Vdc or 110 Vac) |
| | POWER SUPPLY FOR THE DIGITAL INPUTS | ■ Internal (isolated) or external 24 Vdc<br>■ External 110 Vac |
| | DIGITAL INPUT CURRENT | ■ 11 mA @24 Vdc / 5 mA @ 110 Vac |
| | INSULATION | ■ 3 kV |
| DIGITAL OUTPUTS | NUMBER OF DIGITAL OUTPUTS | ■ 4 relay outputs |
| | CONTACT GROUPING | ■ 2 SPST outputs<br>■ 2 SPST outputs with shared common |
| | MAXIMUM MANEUVER VOLTAGE | ■ 250 Vdc, 240 Vac |
| | SMALLEST MANEUVER POWER | ■ 1 W ou 1 VA |
| | RELAY CONTACT MANEUVER CAPACITY | ■ UL 508: C300, R300<br>■ AC-15 (IEC 60947-5-1): 1,5 Aac / 120 Vac<br>0,75 Aca / 240 Vac<br>■ DC-13 (IEC 60947-5-1): 0,22 Adc / 125 Vdc<br>0,1 Adc / 250 Vdc |
| | CONTACT CAPACITY (RESISTIVE LOAD) | ■ 5 A, 30 Vdc / 250 Vac |
| | EXTERNAL PROTECTION AGAINST SHORT-CIRCUIT | ■ 6 A gl/gG fuse |
| | MECHANICAL LIFE | ■ 1.000.000 cycles |

| | | |
|---|---|---|
| EARTH LEAKAGE SENSOR (ELS) | CURRENT RANGES | ■ 0.3 ... 5 Aac |
| | NOMINAL ISOLATION VOLTAGE Ui | ■ 690 Vac |
| | NOMINAL OPERATING VOLTAGE Ue | ■ IEC 60947-4-1: 690 Vac<br>■ UL 508: 600 Vac |
| | IMPULSE STRENGTH Uimp | ■ 6 kV |
| | FREQUENCY RANGE | ■ 50/60 Hz |
| | APPLICATION | ■ Single-phase and three-phase |
| | INTERNAL DIAMETER OF THE WINDOW | ■ EL1: 35 mm (1.37 in)<br>■ EL2: 70 mm (2.75 in)<br>■ EL3: 120 mm (4.72 in)<br>■ EL4: 210 mm (8.27 in) |
| | TERMINAL STRIPS | ■ Torque: 0.29 Nm - 2.6 lb.in<br>■ Conductor cross section:<br>- Stripped solid wire: 1 x (0.2 ... 2.5 $mm^2$); 1 x (22 ... 14 AWG)<br>- Stranded with/without wire end ferrules: 1 x (0.2 ... 1.5 $mm^2$); 1 x (22 ... 14 AWG)<br>■ Screws: M3 |

## 9.1 MECHANICAL DATA

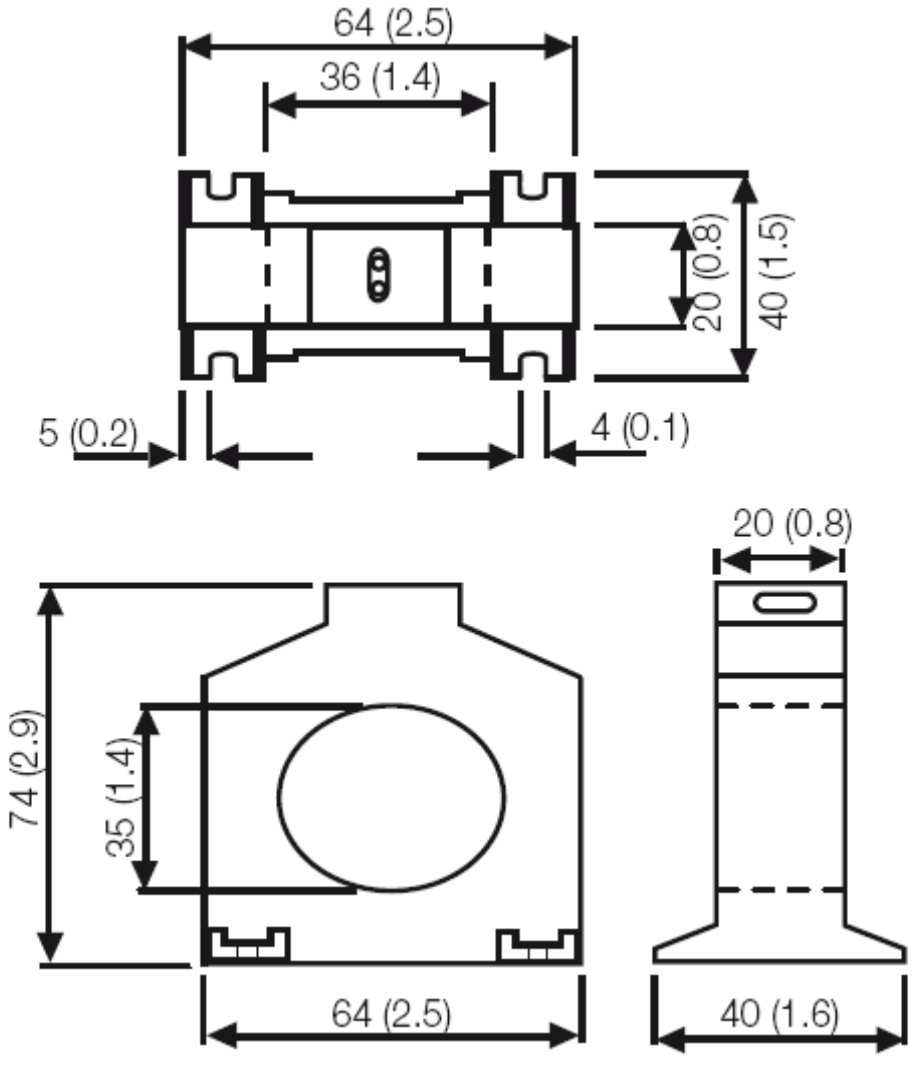
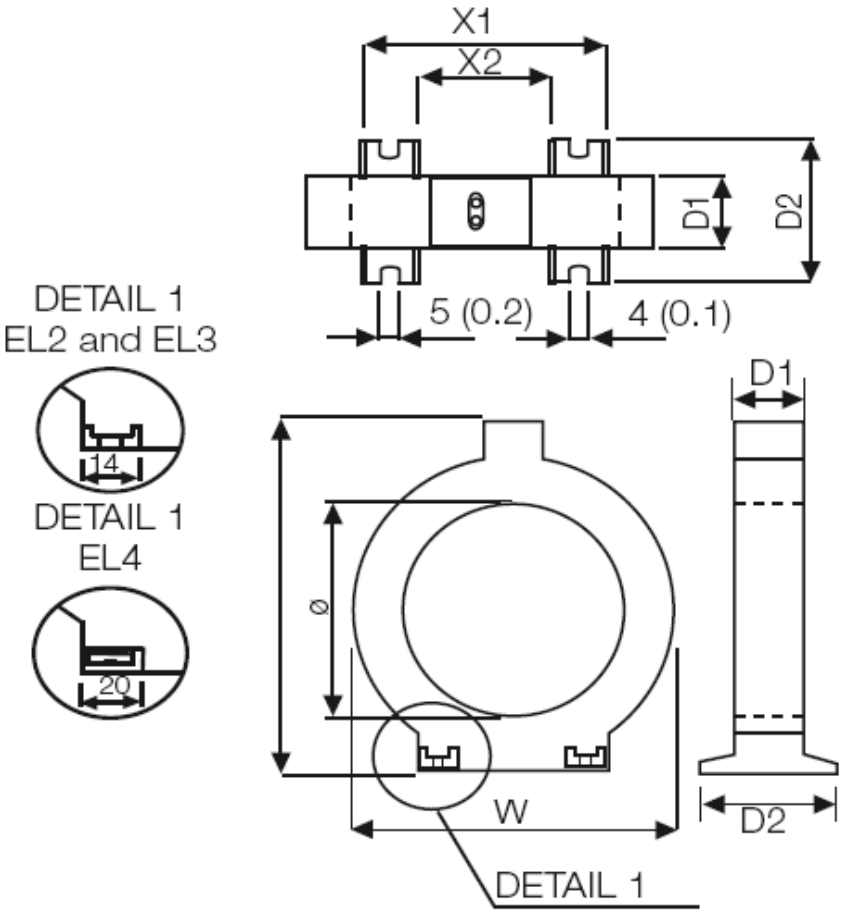



***Figure 9.1:*** *Dimensions mm (in) of the EL1 Earth Leakage Sensor*




| Model | Ø | H | W | X1 | X2 | D1 | D2 |
|---|---|---|---|---|---|---|---|
| EL2 | 70 (2.7) | 116 (4.6) | 104 (4.1) | 64 (2.5) | 36 (1.4) | 20 (0.8) | 40 (1.6) |
| EL3 | 120 (4.7) | 169 (6.6) | 154 (6.1) | 94 (3.7) | 66 (2.6) | 20 (0.8) | 40 (1.6) |
| EL4 | 210 (8.3) | 304 (11.9) | 290 (11.4) | 150 (5.9) | 110 (4.3) | 33 (1.3) | 90 (3.5)(*) |

**(*)** with metallic support at the base.

***Figure 9.2:*** *Dimensions mm (in) of the EL2, EL3 and EL4 Earth Leakage Sensors*