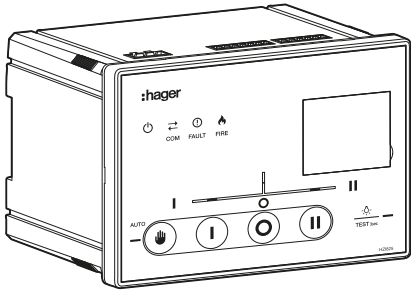


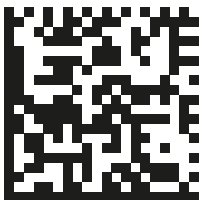
(EN) Automatic Transfer Switching
Equipment Controller for HIB4xxM

Instruction manual

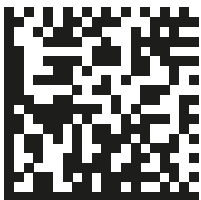
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HZI815/HZI825



<http://hgr.io/r/hzi815>



<http://hgr.io/r/hzi825>

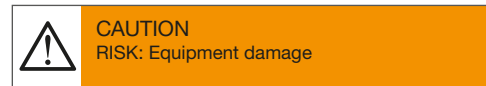
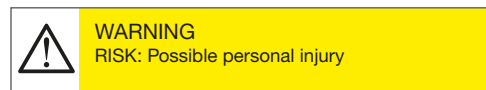
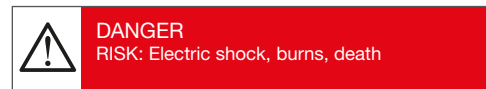
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1. General Safety Instructions

- This manual provides instructions on safety, connections instructions on the HZI815 or HZI825 ATS Controller.
- Weather the HZI815 or HZI825 is sold as a loose product, as a spare, in a kit or as part of an enclosed solution or in any other configuration, this device must always be installed and commissioned by qualified and experienced personnel, in line with the manufacturers recommendations, following good engineering practices and after having read and understood the details in the latest release of the relative product instruction manual.
- Maintenance on the product and any other associated equipment including but not limited to servicing operations must be performed offload by adequately trained and qualified personnel using the appropriate protection equipment.
- Each product is shipped with a label or other form of marking including rating and other important specific product information. One must also refer to and respect markings on the product prior to installation and commissioning for values and limits specific to that product.
- Using the product outside the intended scope, outside Hager recommendations or outside the specified the specified ratings and limits can cause personal injury and/or damage to equipment.
- This instruction manual must be made accessible so as to be easily available to anyone who may need to read it in relation with the HZI815 or HZI825.
- HZI815 or HZI825 meets the European Directives governing this type of product and includes CE marking on each product.
- No covers on the HZI815 or HZI825 should be opened (with or without voltage) as there may still be dangerous voltages inside the product such as those from external circuits.
- **Do not handle any control or voltage sensing cables connected to the HZI815 or HZI825 when voltage may be present on the product directly through the mains or indirectly through external circuits.**
- Voltages associated with this product may cause injury, electric shock, burns or death. Prior to carrying out any maintenance or other actions on live parts in the vicinity of exposed live parts, ensure that the switch including all control and associated circuits are de-energized.



The information provided in this instruction manual is subject to change without notice, remains for general information only and is non-contractual.

Abbreviation and terms:

ATS :	Automatic transfer switch (as defined in 60947-6-1)
ATSE :	Automatic transfer switching equipment (as defined in 60947-6-1)
RTSE :	Remotely operated transfer switching equipment (as defined in 60947-6-1)
HMI :	Human machine interface (includes DIP switch and LED information available on the HZI815 or HZI825 front face).

2. Standards

- As a minimum the HZI815 or HZI825 comply with the following inter national standards:
 - IEC/EN 60947-6-1*
 - IEC/EN 60947-1
 - IEC/EN 61010-2-201
 - IEC/EN 61010-2-030
 - IEC/EN 61010-1
 - GB/T 14048.11*
 - GB/T 14048.11 Annex C
 - EMC 60947
- The Electromagnetic compatibility (EMC) directive 2004/30/EU
- LVD Low voltage directive 2014/35/EU
- EMC according to IEC/EN 60947-6-1 and GB/T 14048.11 (including annex C) & IEC / EN 61326-1 standard
- Vibration according to IEC 60068-2-6 / GB/T 2324.10
- Shock test according to IEC 60068-2-27 / GB/T 2324.5
- Dry heat 16 h , 70 °C according to IEC 60068-2-2 / GB/T 2324.2
- Damp heat at 55°C according to IEC 60068-2-30 / GB/T 2324.4
- Low Temperature 16 h, -25 °C according to IEC 60068-2-1 / GB/T 2423.1
- Salt mist severity 1 according with IEC 60068-2-52 / GB/T 2423.11

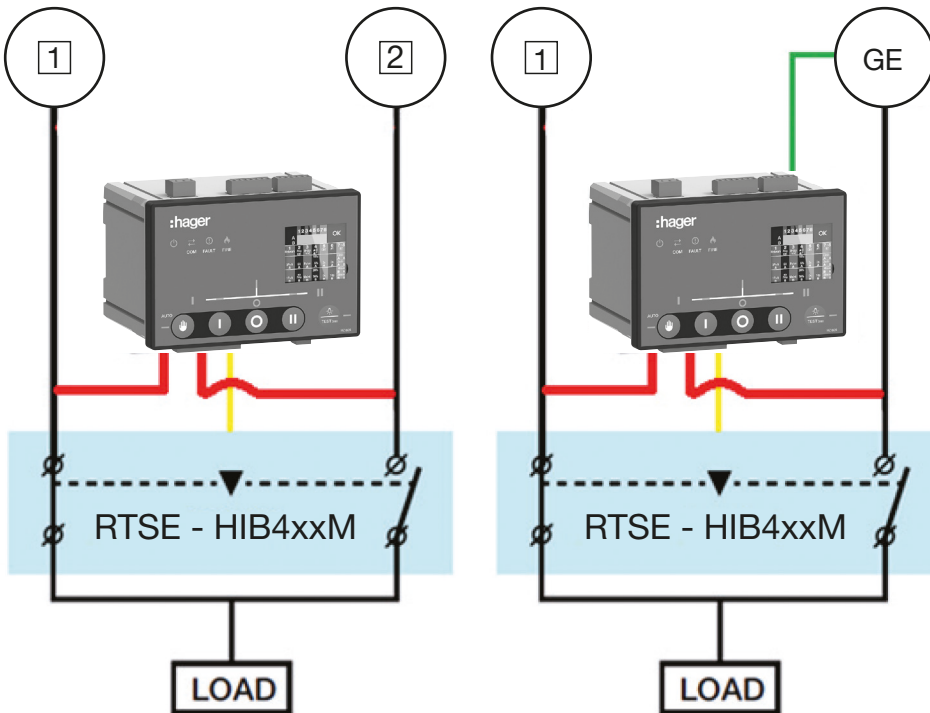
* When associated with HIB4xxM RTSE products

3. Introduction

HZI815 or HZI825 “ATS Controller” in association with an RTSE (Remote transfer switching equipment) forms an ATSE (Automatic transfer switching equipment), the ATSE formed by the association is designed for use in power systems for the safe transfer of a load supply between a normal and alternate source. When associated with HIB4xxM RTSE the changeover is done in open transition insuring full compliance with IEC 60947-6-1, GB 14048-11 and other international standards as listed. As a standalone product the HZI815 or HZI825 is compliant with IEC 61010-2-201 and is compatible with use with PC and CC type RTSE.

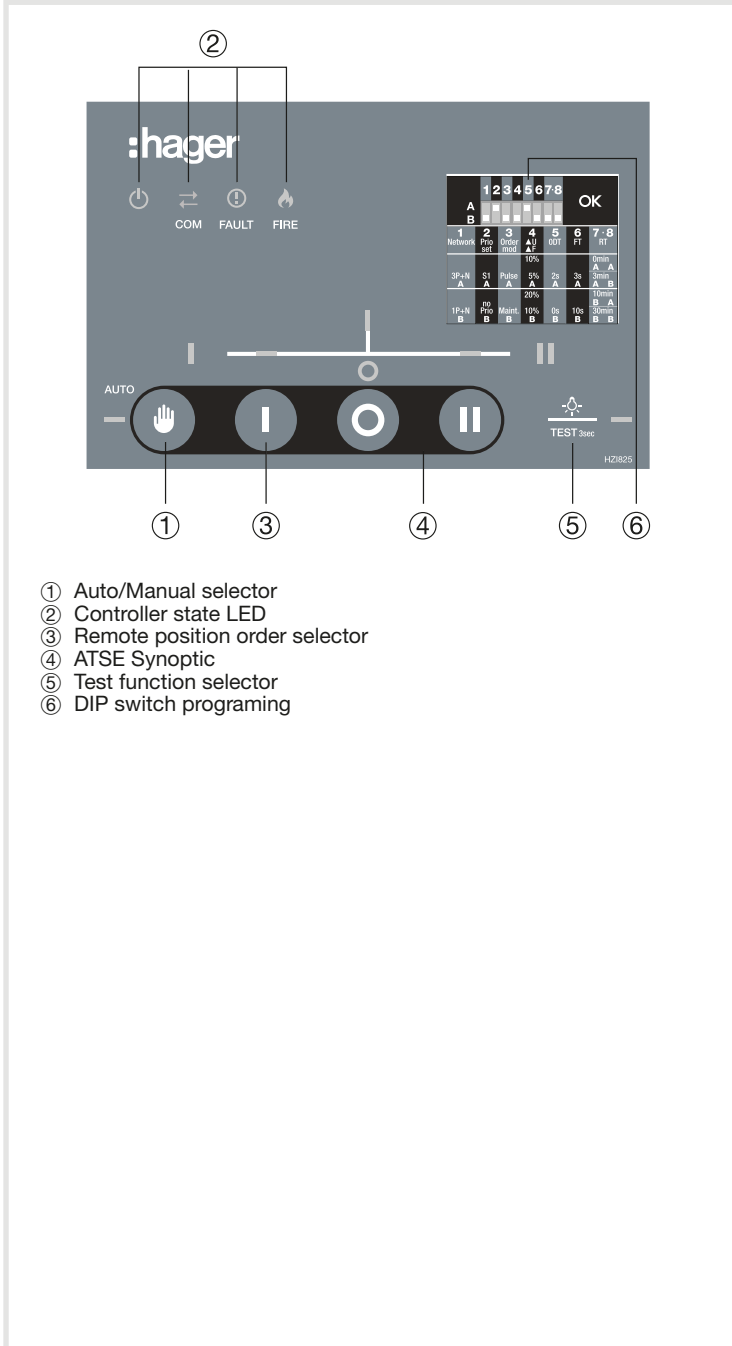
HZI815 or HZI825 “ATS Controller” Ensures:

- Monitoring of the availability of a Normal and Alternate source
- Supply to the controller and switch from the Normal or Alternate source
- Transfer orders to the RTSE and position reception from the RTSE
- A complete solution fully tested with HIB4xxM RSTE
- Intuitive HMI for emergency/local operation
- Clearly visible and indicated HMI
- Suitable for door mounting on the enclosure or DIN Rail mounting inside the enclosure
- Inherent electrical interlock between position orders
- Monitoring of the RTSE stable positions (I – 0 – II)
- Straightforward installation with effective ergonomics
- Power supply continuity for most Utility / Generator or Utility / Utility network applications when linked to an RTSE (Remotely operated transfer switches).

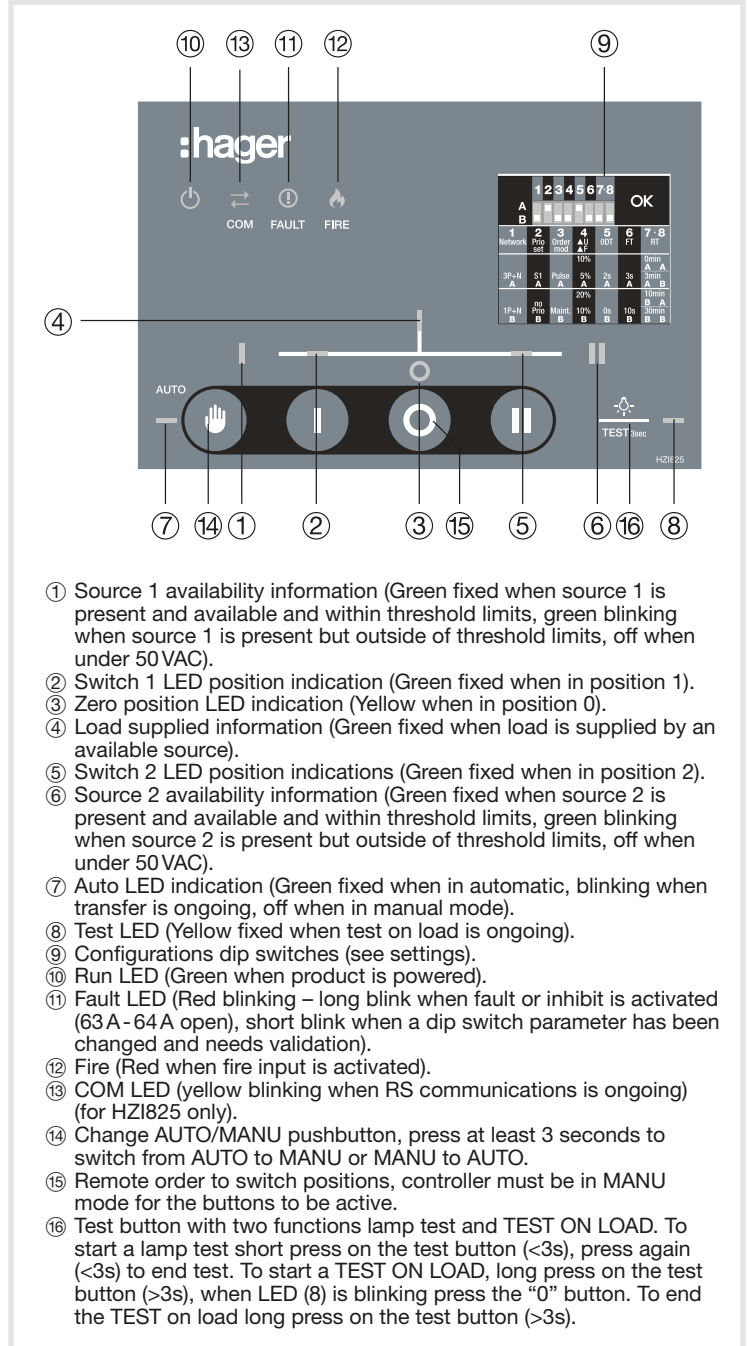


4. General overview

4.1. Product identification



4.2. Controller HMI



4.3. LED Functioning modes

LED indicator (cf image)	LED blinking	LED ON**	LED OFF*
① Source 1 availability	Source 1 present but not available for following possible reason: - Source under voltage / under frequency - Source overvoltage / over frequency - Phase rotation order of source 1 & 2 are different	Source is available	Source is not available
② Position I indicator	-	RTSE is in position I / Load is connected to source 1	RTSE is not in position 1 / Load is not connected to source 1
③ Position 0 indicator	-	RTSE is in position 0 / Load is not connected to either source 1 or source 2	RTSE is in position 0 / Load is not connected to either source 1 or source 2
④ Load supplied indicator	-	Load is being supplied by a source which is available	Load is not being supplied by a source which is available
⑤ Position II indicator	-	RTSE is in position II / Load is connected to source 2	RTSE is not in position II / Load is not connected to source 2
⑥ Source 2 availability	Source 2 present but not available for following possible reason: - Source under voltage / under frequency - Source overvoltage / over frequency - Phase rotation order of source 1 & 2 are different	Source is available	Source is not available
⑦ AUTO/MANUAL indicator	A timer is counting down and a transfer will be initiated. (If fault is blinking with buzzer AUTO/MANU will be blinking)	The controller is in automatic mode	Controller is not in automatic mode possible modes: - Manual - Inhibited - Fault detected
⑧ TEST led	-	Test is ongoing	No test ongoing
⑩ Power	-	Controller is powered up	Controller is OFF
⑪ Fault indicator	Fast blinking (3Hz): one or more Dip switch has changed and configuration has not been saved. Long blinking (2Hz): Inhibit input is active or fault is active	-	Inhibit is not active / no faults active and dip switch configuration has been saved.
⑫ Fire LED	-	Fire input is activated	-
⑬ Communication (only for HZI825)	Controller is sending / receiving information	Communication parameters have been modified (Baud rate / Parity / Address)	No communications orders are currently being sent or received

* Considering that the controller is powered.

** Considering that lamp TEST has not been initiated.

4.4. Environmental

The HZI815 and HZI825 controllers meet the following environmental requirements:

4.4.1. IP Rating



IP degree according to IEC 60529

- IP4X on the front face when door mounted.
- IP2X on the back of the controller.

4.4.2. IK Rating

IK rating according to IEC 61010-2-201

- IK08 on the front face when door mounted

4.4.3. Operating Conditions

- From -25 to + 70°C
- 95% humidity without condensation at 40°C according to IEC 61010-1
- 95% humidity without condensation 50°C according to GB14.11 Annex Q

4.4.4. EMC

- IEC/EN 60947-6-1 and GB/T 14048.11 (including annex C) standards
- IEC / EN 61326-1

4.4.5. Altitude



- Up to 2000m

4.4.6. Storage Conditions

- From -30 to +70°C
- Maximum storage up to a period of 12 months
- To be stored in a dry, non-corrosive and non-saline atmospheric conditions
- A maximum of 3 boxes may be stacked vertically

4.4.7. Volume and shipping weights

- Volume LxWxH (mm): 172x128x154.5
- Weight : 850 g

4.4.8. Lead free process

- HZI815 or HZI825 complies with :
- The EU directive for RoHS 2 2011/65/EU
- The EU directive RoHS 3 2015/863/EU
- China RoHS 2 SJ/T 11364-2014



4.4.9. WEEE

- HZI815 or HZI825 is built in accordance with 2012/19/EU directive:



4.4.10. Pollution class

- Pollution class II

4.4.11. Other compliances and marking



4.5. HZI815 or HZI825 accessories and compatible products

The HZI815 or HZI825 is compatible and compliant according to IEC 60947-6-1 when used with the following IEC 60947-6-1 RTSE and specific product connection harness.

- HIB4xxM (from 125 to 200A) with HZI420 and HZI422
- HIB4xxM (from 250 to 400A) with HZI420 and HZI423
- HIB463M (630A) with HZI420 and HZI424
- HIC4xxR (from 250 to 630A)
- HIC4xxD (from 125 to 3200A)

5. Content of packaging

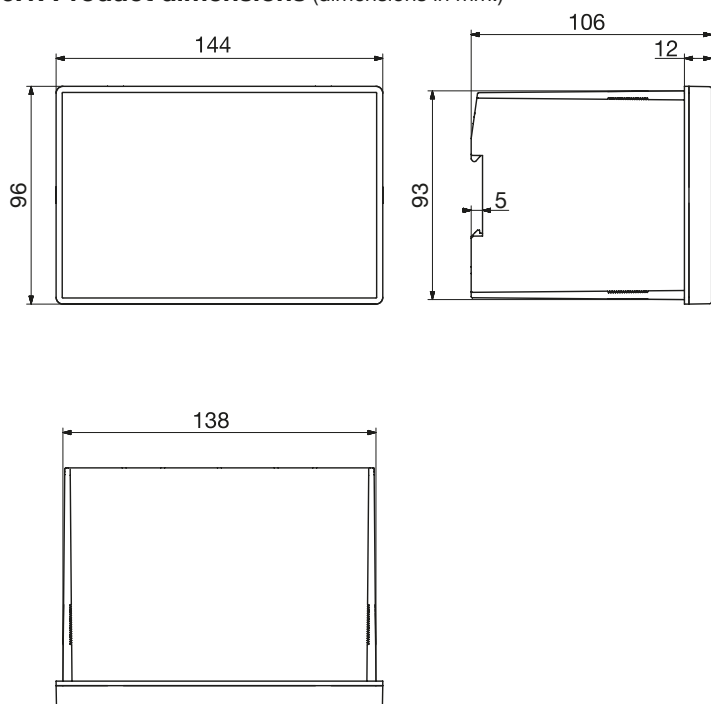
The HZI815 or HZI825 packaging includes:

- 1 HZI815 or HZI825 controller
- 1 quickstart guide
- All connectors
- Door mounting clips

All other products described in this instruction sheet **are delivered and sold separately.**

6. Installation

6.1. Product dimensions (dimensions in mm.)

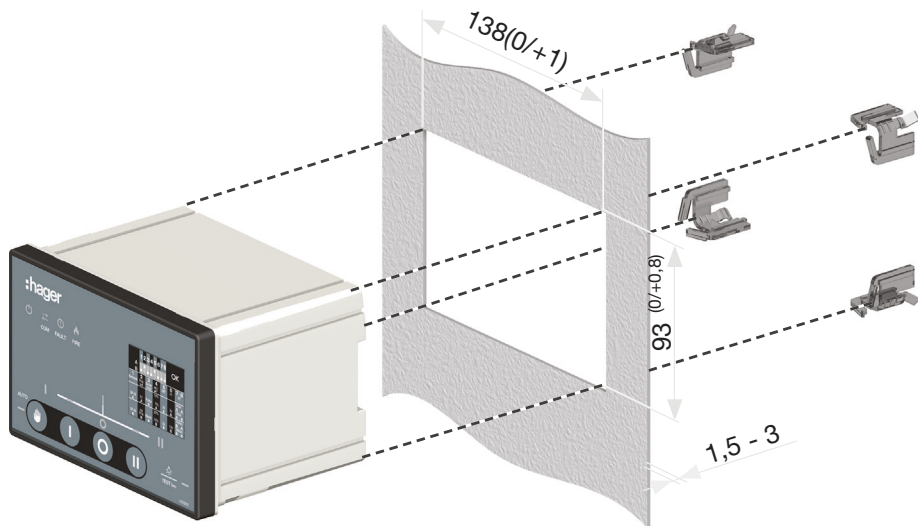


6.2. Mounting

6.2.1. Door mounting

Door cut-out of 93(+0.8) x138(+1) mm, door thickness 1.5 ... 3mm.

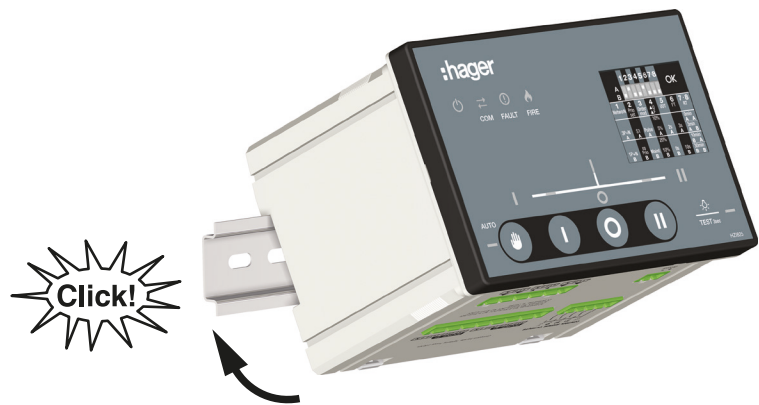
Remove all connectors and clip before inserting the controller in the cut-out then fix the controller in place using all 4 fixations clips (cf. image below):



6.2.2. DIN RAIL mounting

Install on IEC 60715 Standard Din RAIL.

When mounting make sure both clips are pushed up, then clip on the DIN Rail.



To remove from the DIN Rail, drag the two mounting clips down before removing the product.



7. Connections



DANGER

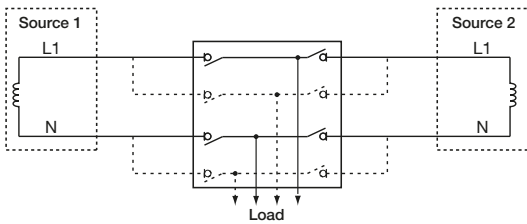
When using HZI815 or HZI825 without the wire bundle (ref HZI420 or HZI421), gG 4A fuse protection is required on the voltage sensing inputs of connection diagrams. When using HZI815 or HZI825 with HIB4xxM and the wire bundle (ref HZI420 or HZI421) gG fuses are not mandatory.

7.1. Networks

7.1.1. Type of networks

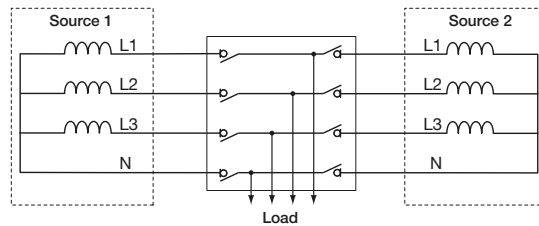
1P+N:

HZI815 or HZI825 is suitable for single phase networks, for with voltages within 184-300 VAC L-N. In these networks, the phase must be connected to the L1 input (terminal 104 for source 1 and 204 for source 2).



3P+N:

HZI815 or HZI825 is suitable for three phase with neutral networks, for with voltages within 184-300 VAC L-N and 318-520 VAC L-L'.



7.1.2. Metering and sensing detail

Network type	1P	3P + N
Source 1	1 phase 2 wire	3 phase 4 wire
Source 2		
Source 1		
Source 2		
Voltage sensing		
Source 1	- V1	U12, U23, U31 V1, V2, V3
Source 2	- V1	U12, U23, U31 V1, V2, V3
Source presence (source available)	✓	✓
Source in ranges (U, V, F)	✓	✓



In 3 phases with Neutral balanced networks, there is a risk that the loss of neutral will not be detected. To limit this risk the Dip switch 4 (Hysteresis) can be switched to position A.

7.1.3. Connections

AC-1 AC general use: Uc=230V-50/60Hz Ic=5A
AC-15: Uc=240V-50/60Hz Ic=1.5A
DC-1 DC general use: Uc=24V U=12V Ic=1A
DC-13: Uc=24V U=12V Ic=1.1A

AC general use: Uc=230V-50/60Hz Ic=5A
AC-15: Uc=240V-50/60Hz Ic=1.5A
DC-1 DC general use: Uc=24V U=12V Ic=1A
DC-13: Uc=24V U=12V Ic=1.1A

Rated Supply Voltage: 230V - L-N 50/60Hz
Power consumption: 10 W

Connectors this side: Tightening Torque: 0.58 Nm

CONTROL SIGNAL OUTPUTS: Com, I, II, O, +, -

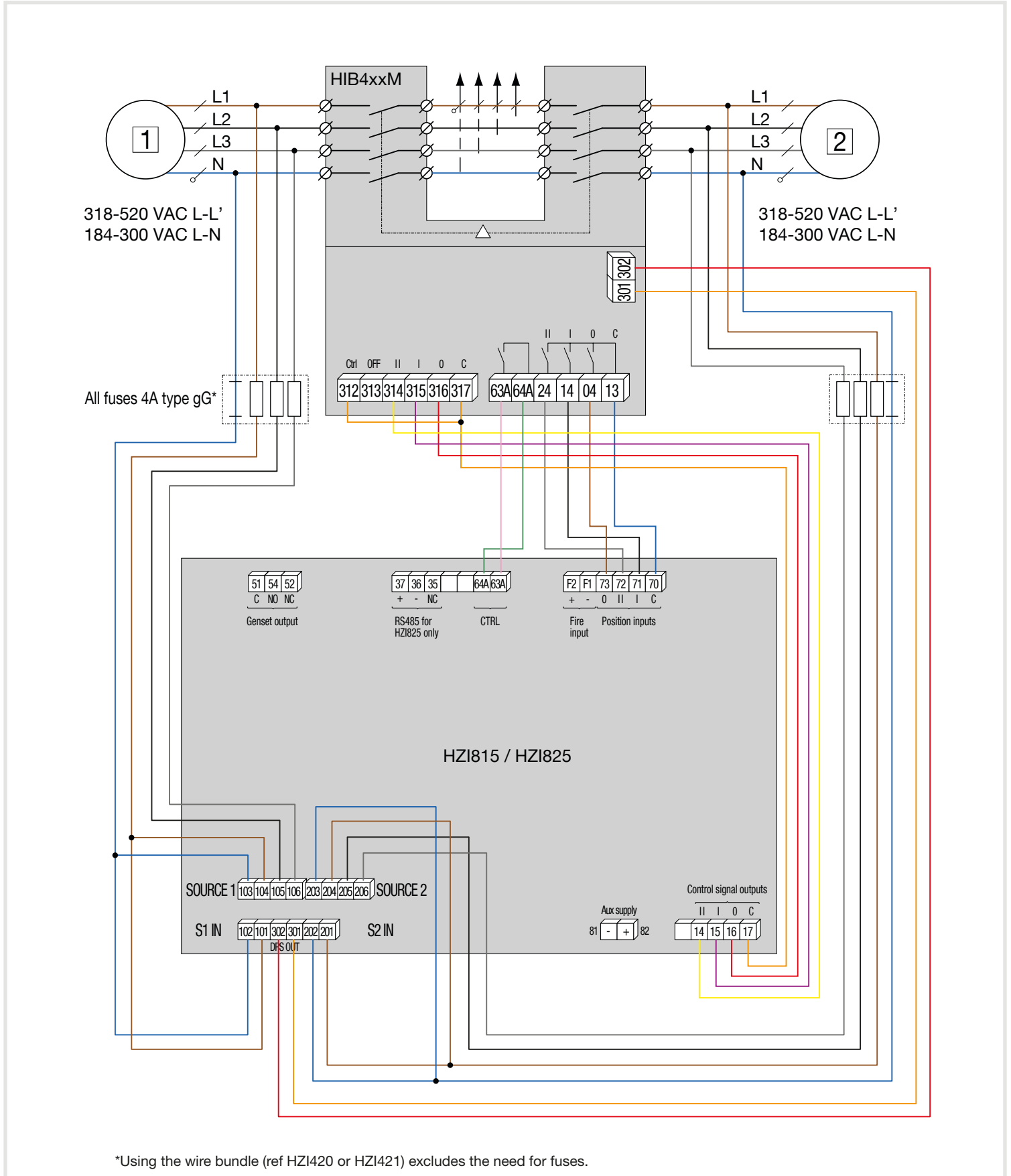
SOURCE S2: L3, L2, L1, N

SOURCE S1: L3, L2, L1, N

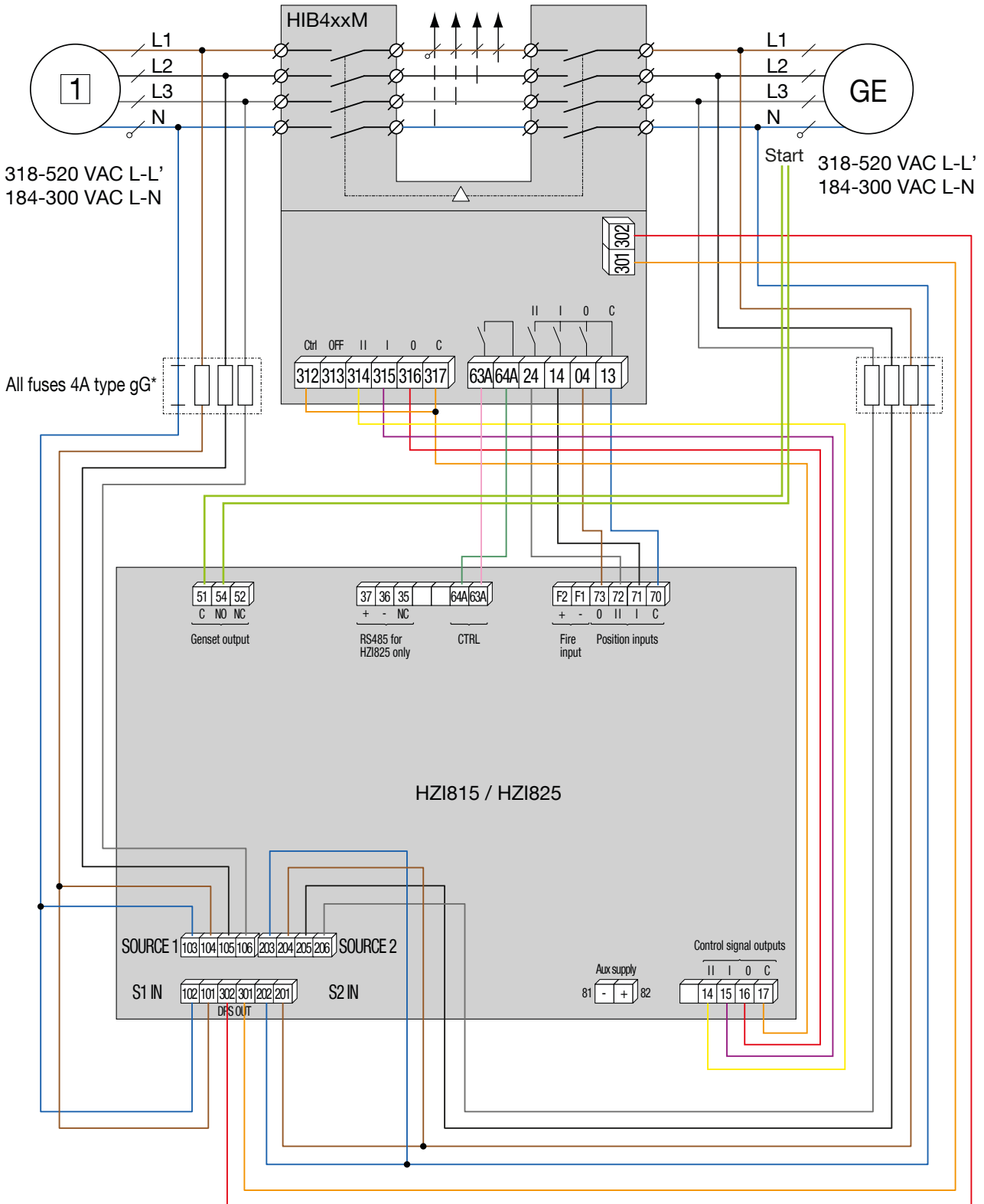
Optional Aux. Supply 24V=(10W): S2 IN, S1 IN, DPS OUT, L1 IN, L2 IN, L3 IN

Legend:
 ① Motorized Change Over Switch position feedback input.
 ② 24 VDC fire input.
 ③ Enable control when closed/disable control when open.
 ④ Genset Start relay.
 ⑤ Motorized Change Over Switch position control outputs.
 ⑥ Source 1 and 2 voltage sensing inputs.
 ⑦ 24 VDC Aux supply.
 ⑧ External Double Power Supply (DPS) - Input/output.
 ⑨ RS485 connections (for HZI825 only).

7.1.4. HZI815 / HZI825 with HIB4xxM
for network / network application type

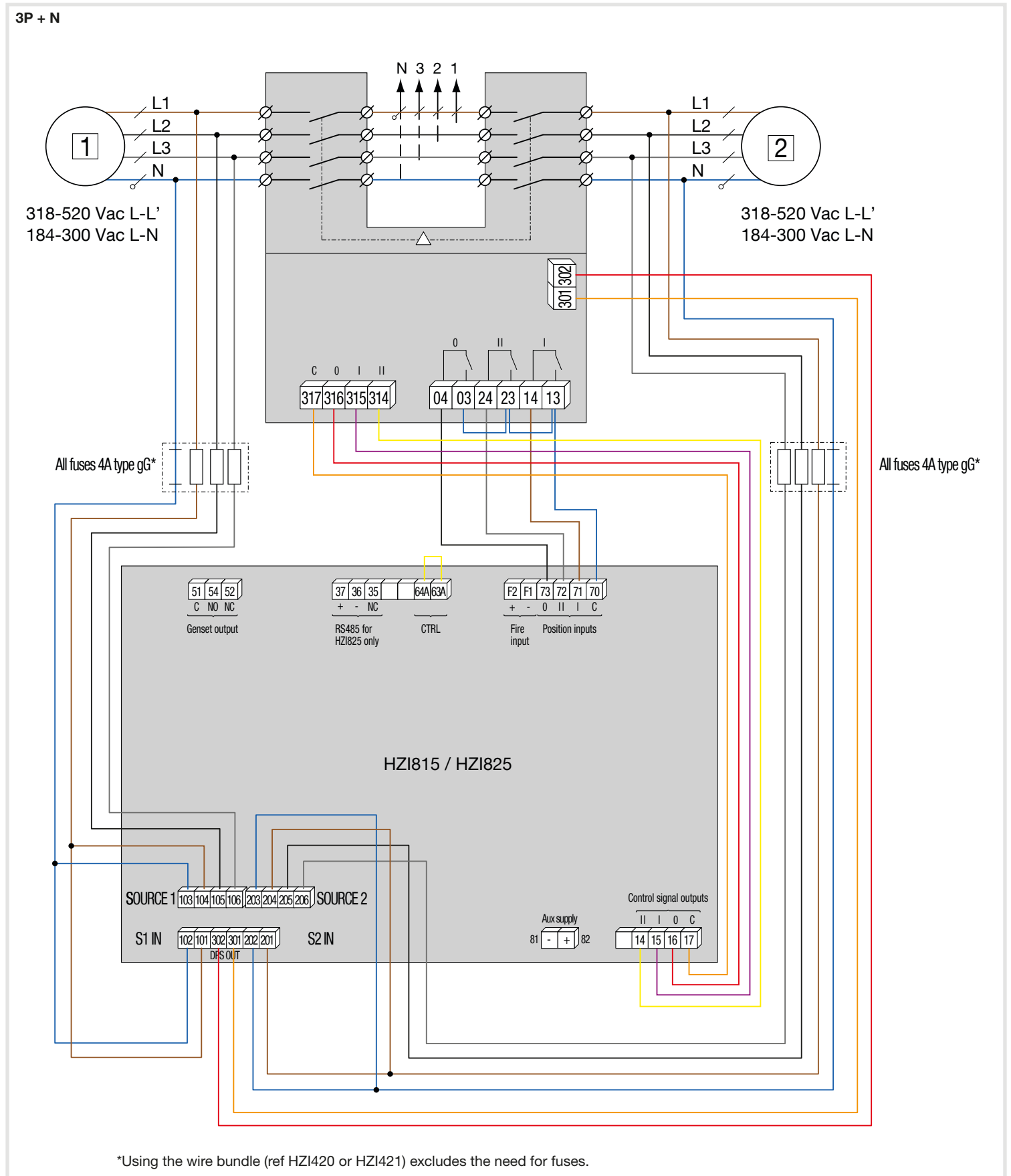


7.1.5. HZI815 / HZI825 with HIB4xxM
for network / genset application type

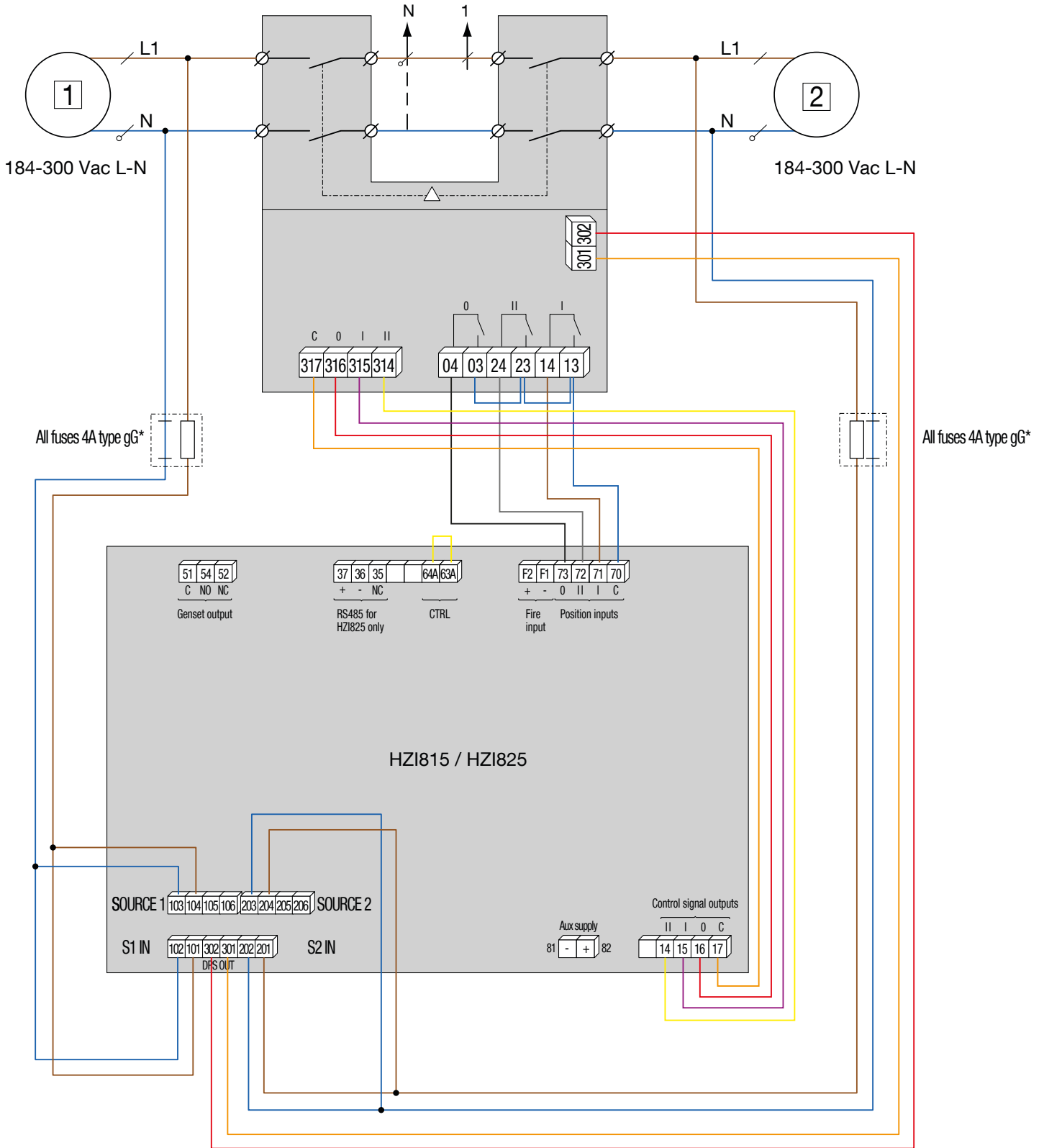


*Using the wire bundle (ref HZI420 or HZI421) excludes the need for fuses.

7.1.6. HZI815 / HZI825 with HIC4xxR
for network / network application type

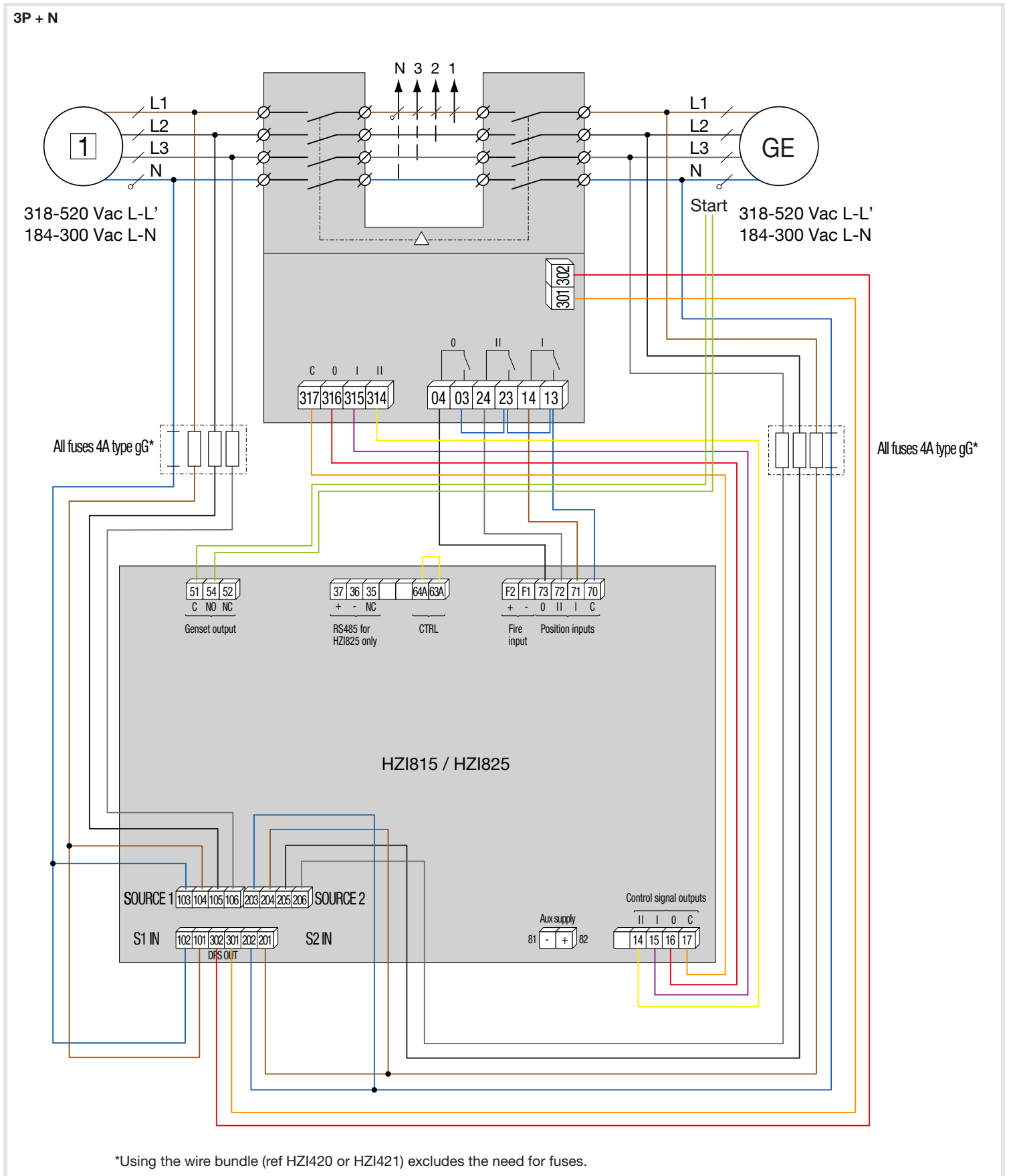


1P + N

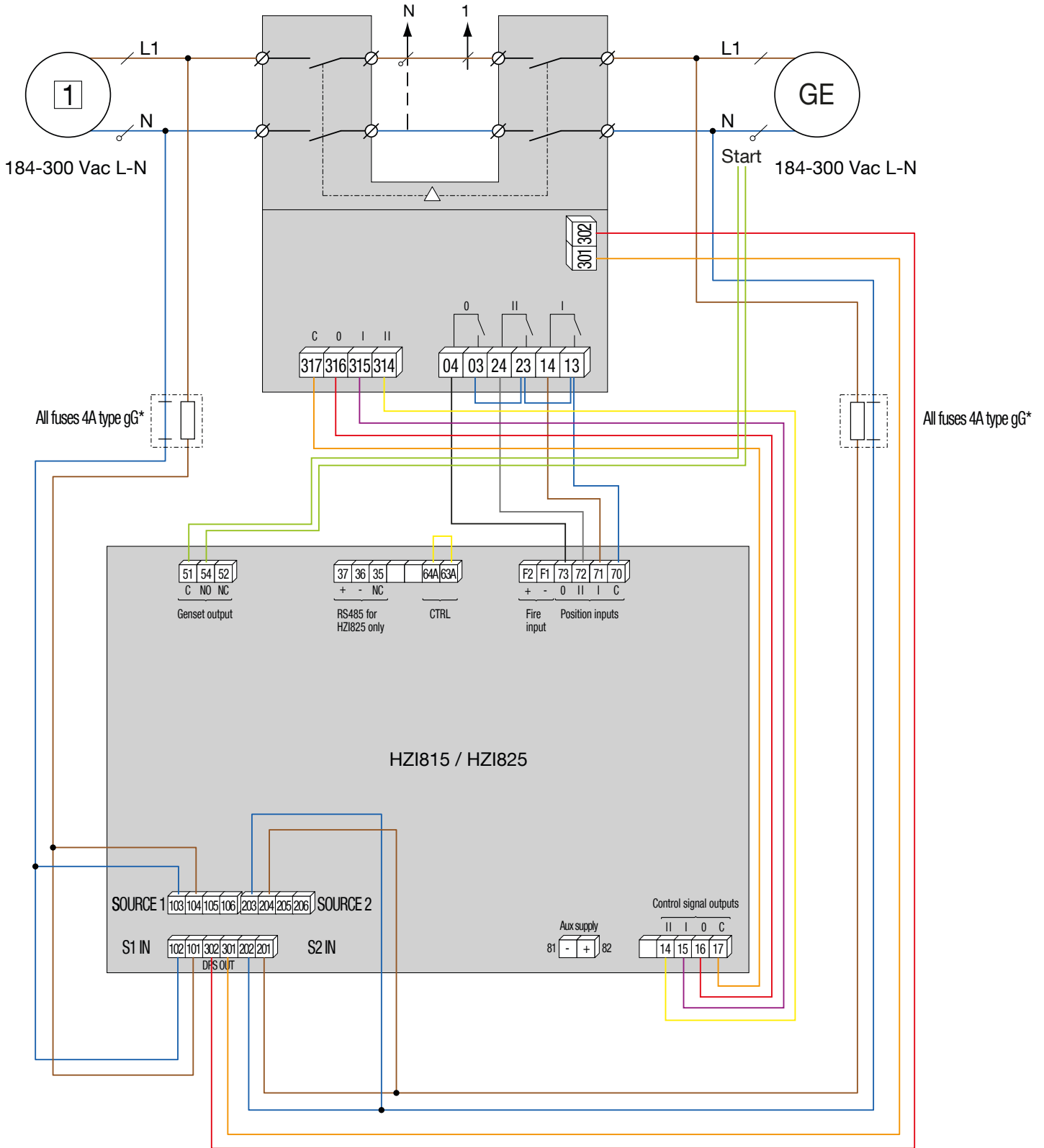


*Using the wire bundle (ref HZI420 or HZI421) excludes the need for fuses.

7.1.7. HZI815 / HZI825 with HIC4xxR
for network / genset application type

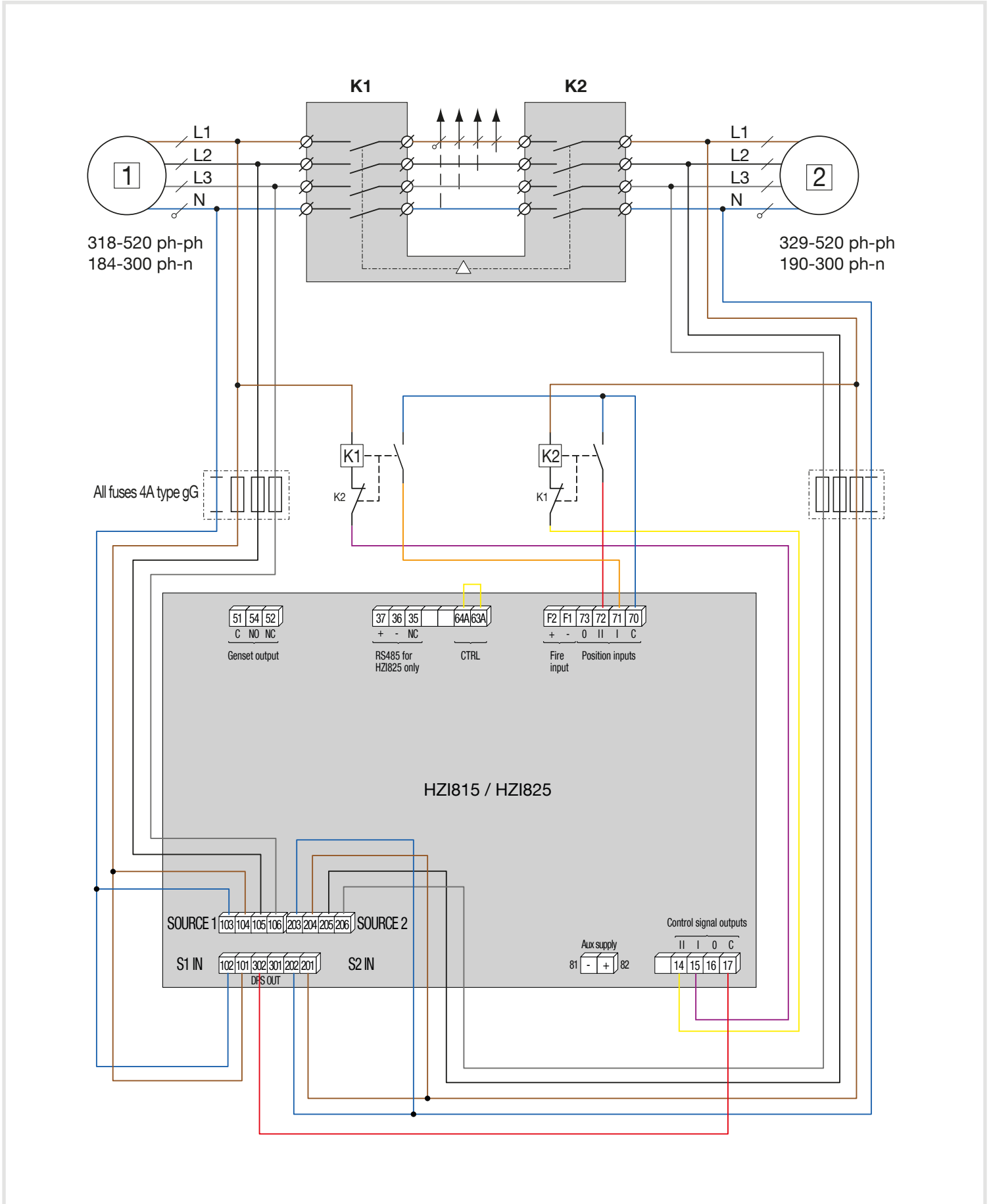


1P + N



*Using the wire bundle (ref HZI420 or HZI421) excludes the need for fuses.

7.1.8. Connections with standard CC type based TSE



7.2. Terminal denomination, description and characteristics

Denomination	Terminal	Description	Characteristics	Recommended Cable section	Tightening torque / screw type
Control signal outputs (orders to RTSE)	14	Position II order	AC1 - General use - Ie: 5A, Ue: 250 VAC DC1 - General use - Ie: 5A, Ue: 30 VDC AC15 - Ie: 3A, Ue: 120 VAC AC15 - Ie: 1.5A, Ue: 240 VAC DC13 - Ie: 0.22A, Ue: 125 VDC DC13 - Ie: 0.11A, Ue: 250 VDC	1 ... 2.5mm ²	0.58 Nm
	15	Position I order			
	16	Position 0 order			
	17	Common point for position output			
Genset output	51	Common point	AC1 - General use - Ie: 3A, Ue: 250 VAC DC1 - General use - Ie: 3A, Ue: 30 VDC AC15 - Ie 54/51: 3A 52/51: 1.5A Ue: 120 VAC AC15 - Ie 54/51: 1.5A 52/51: 0.75A Ue: 240 VAC DC13 - Ie 54/51: 0.22A 52/51: 0.22 A 125 VDC DC13 - Ie 54/51: 0.11A 52/51: 0.11 A 250 VDC	1 ... 2.5mm ²	0.58 Nm
	52	Closed to start the Genset (closed when controller is powered off)			
	54	Open to start the genset			
Controller inhibit input	63A	Controller is inhibited when this contact is open	Do not use external voltage - Power from common point		
	64A				
Return of information from RTSE (Position inputs)	70	Common point for position inputs	Do not use external voltage - Power from common point	0.5 ... 1.5mm ²	0.2 Nm / M2
	71	Position I RTSE			
	72	Position II RTSE			
	73	Position 0 RTSE			
Fire input	F1	Negative electrode of the 24 VDC	12-24 VDC		
	F2	Positive electrode of the 24 VDC			
Optional Aux supply 24 VDC	81	Negative electrode of the 24 VDC	10-30 VDC (Auxiliary supply for controller, does not supply RTSE)		
	82	Positive electrode of the 24 VDC			
Source 1 and 2 voltage inputs	103	Source 1 N	Sensing range: 90-520 VAC (ph-ph) 50-300 VAC (ph-n) 45-65 Hz Supply: 184-300 VAC* (ph-n) 45-65 Hz Max consumption: 10 W *200-300 VAC in maintained mode	1 ... 2.5mm ²	0.58 Nm / M3
	104	Source 1 L1			
	105	Source 1 L2			
	106	Source 1 L3			
	203	Source 2 N			
	204	Source 2 L1			
	205	Source 2 L2			
206	Source 2 L3				
DPS output (RTSE power supply)	301	Phase output	AC - General use - Ie: 6A, Ue: 250 VAC DC - General use - Ie: 6A, Ue: 30 VDC AC15 - Ie: 3A, Ue: 120 VAC AC15 - Ie: 1.5A, Ue: 240 VAC DC13 - Ie: 0.22A, Ue: 125 VDC DC13 - Ie: 0.11A ,Ue: 250 VDC		
	302	Neutral output			
RS485	35	NC – Not connected	HTG465H - RJ45-bare wire Modbus cable 3 m HTG485H - Modbus cable 25 m	LiYCY shielded twisted pair	0.2 Nm / M2
	36	Negative electrode			
	37	Positive electrode			

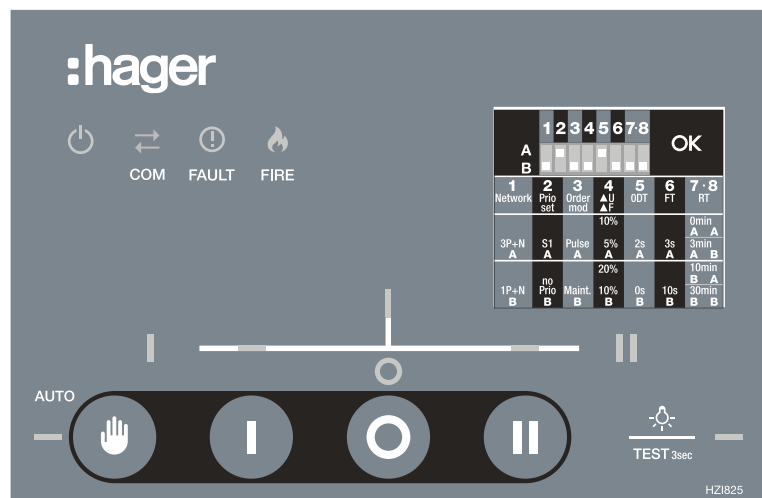
NOTE 1: Use 7mm as stripping length for the controller terminals

NOTE 2: Use 90°C copper wire for installations with ambient temperature from 35 to 60°C.

When the ambient temperature is above 60°C, Use 105°C copper wire.

8. HZI815 or HZI825 operating modes

HZI815 or HZI825 has 3 distinct working modes, the working modes are selected using the HMI button or by using the 63A/64A input.




The 3 working modes are working as described below:

- Auto mode


In this mode the controller will automatically give orders to the RTSE connected to switch to the correct position according to the settings selected.

In this mode, the manual order buttons , ,  are disabled.

This mode is activated when the LED 7 is ON (fixed). To access this Mode make sure that you are in manual mode (the LED 7 is OFF and that the fault LED (12) or the TEST LED (8) are not activated) and then press the button  for 3 seconds, the LED 7 should then turn ON.

- Manual mode

In this mode the manual orders buttons , ,  enable manual orders to switch respectively to position I , 0 or II.

This mode is activated when the LED 7 is OFF and the LED 12 is OFF and that the fault LED (12) or the TEST LED (8) are not activated. To switch from AUTO mode to manual mode, press the button  for 3 seconds

- Inhibit mode

In this mode both the Automatic transfer and manual orders will be blocked. This mode is activated when the input 63A/64A is **OPEN**.

In this mode the fault LED (12) will be blinking, and AUTO LED will be OFF. To leave the inhibit mode close the 63A/64A input, the controller will return to the last working mode (Automatic or Manual).

8.1. Triple power supply

HZI815 or HIZ825 can be supplied by 3 power sources:

AC – Power through the voltage sensing (terminals 103-104 for source 1 and terminal 203-204 for source 2) with power supply range going from 184-300 VAC (in pulse mode) 200-300 VAC (in maintained mode) 50/60 Hz+/- 10%

DC - Auxiliary supply (optional), 10-30 VDC power supply using terminals 82-81.



CAUTION

The DPS output to the RTSE will not be functional when powering through the DC auxiliary power supply.

8.2. Voltage sensing Inputs

HZI815 or HIZ825 includes dual single phase and 3 phase voltage sensing (terminals 103-106 and 203-206) designed to monitor 1 Phase supplies up to 300 VAC (L-N) and 3 phase +N up to 520 VAC (L-L).

HZI815 or HIZ825 is designed to handle single phase and three phases with neutral networks, simply define the correct configuration of single phase / 3phase with neutral using the DIP switch 1 on the front of the controller (cf. Chapter 10-5 programming).

Sensing values measured will have a direct influence on determining the availability of the main and alternate supplies as well as HZI815 or HIZ825 automation.

The parameters monitored through the sensing are the following:

- Phase rotation

When both sources are available the controller will check that both sources have the same phase rotation.

If the two sources have different phase orders the source LED (1 & 6) will blink , the fault LED will light up and the sources will be considered as not available (switch will not transfer from the current position to the opposite source).

If only 1 source is available the product will not check the phase rotation order.



CAUTION

When only one source is available, the controller will automatically accept the source regardless of the phase rotation order.

- Frequency within set limits

HZI815 or HIZ825 will check that the frequency is within the limits configured through DIP switch 4 or through communication (only for HIZ825) (cf. configuration chapter configuration). Frequency is checked on L1 only.

- Loss of the main or alternate power supply

Loss of supply depends on the nominal voltage and frequency configured together with the hysteresis (set in DIP switch 4)The source will be considered as lost after the fail timer as counted down (set through dip switches 7 & 8 (0 / 3 / 10 / 30 min).

- Return of main and/ or alternate power supply

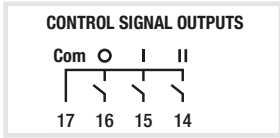
Return of supply depends on the nominal voltage and frequency configured together with the hysteresis set. (Set in DIP switch 4). The source will be considered as available when the return timer will have counted down (set through dip switches 6 (3s / 10s).

- Loss of Neutral

In a 3 phase network with unbalanced loads the loss of the neutral will be detected.


8.3. Fixed outputs


8.3.1. Control signal outputs




Control signal outputs are the output orders (dry contact) to the RTSE; HZI815 or HZI825 includes 3 signal outputs and a common (point powered by the user) (Terminals 17 to 14). These outputs are rated for 250 VAC, 50/60 Hz 5A general use, and 30 VDC 5A general use.

These outputs function as described below:

When order 0 is given through the Automatism in automatic mode or manually using the button , the contact between 17 and 16 will be closed.

When order I is given through the Automatism in automatic mode or manually using the button , the contact between 17 and 14 will be closed.

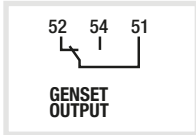
When order II is given through the Automatism in automatic mode or manually using the button , the contact between 17 and 15 will be closed.

These outputs can be impulse or maintained depending on the setting on DIP switch 3 Order Mod.

In maintained mode when an order is sent it will be maintained until a different order is sent.

In impulse mode orders are sent for maximum 5s and are stopped when either 5s has expired or the controller received feedback that the RTSE has reached the requested position. If 5s expire and the RTSE has not reached the requested position the controller will consider this as a fault and will inhibit the automatism until the fault is cleared.

8.3.2. Genset start output



Genset start outputs are the output orders (dry contact), the contact between 51 and 54 will open & the contact between 51 and 52 will close when the signal to start the genset should be sent (during a test on load or when source 1 is lost). These outputs are rated for 250 VAC, 50/60 Hz 5A general use for NO contact and 3A general use for NC contact, and 30 VDC 5A general use for the contact between 51-54 and 3A general use for the contact 51-52.

Control	51/54	51/52
Generator Start	Contact open	Contact closed
Generator Stop	Contact closed	Contact open

When the switch returns in position I the Cooldown timer will start counting (Default value 180 s) during the cooldown timer, the contacts will maintain the generator start signals.

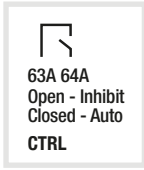


CAUTION

If the 24 VDC auxiliary power supply is not used the timer 1FT will not count and the order to start the generator will be sent immediately when source 1 is lost.

8.4. Fixed inputs

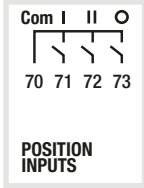
8.4.1. Inhibit input



When the contact 63A/64A is open the controller is in inhibit mode (Fault LED blinking and automatism and manual controls are deactivated). When this contact is closed the controller returns to the last working mode (either manual mode or automatic mode).

When the product is delivered this input is hardwired to closed, to use the input first remove the wire

8.4.2. Position inputs



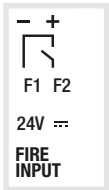
These inputs must be connected from the RTSE to the controller in order to indicate the position of the RTSE, when the controller gives an order both through manual command and automatically it will check that the position input corresponding to this order has closed. If this is not the case the controller fault LED will blink and the buzzer will be on, to clear the fault expected position input should be closed and the user must press the AUTO button.

73/70 must be closed when the RTSE is in position 0.

72/70 must be closed when the RTSE is in position II.

71/70 must be closed when the RTSE is in position I.

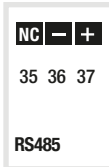
8.4.3. Fire input



This input is activated by applying 24 VDC (12-24 VDC) on F1 and F2 (negative electrode connected to F1 and positive electrode on F2).

When this input is activated the Fire LED (13) will be ON (fixed) and the buzzer will sound, the controller will give the order to the switch to go to position 0 and both manual and automatic controls will be inhibited. When the input is removed, the switch will go back to the last working mode automatically

8.4.4. RS485 (only for HZI825)



The RS485 connector provides the Modbus communication allowing to read values from the controller (eg: Voltage values, settings, switch position etc...) for details on the values that can be read through communication (see Annex II).

8.5. Programming

The programming of the controller is done through the DIP switches available on the front HMI.



WARNING

Program only when in manual mode to avoid unexpected transfers or injuries.

8.5.1. Programming through DIP switch

		1	2	3	4	5	6	7	8	OK			
		A	B	A	B	A	B	A	B				
1	Network	2	Prio set	3	Order mod	4	ΔU ΔF	5	ODT	6	FT	7-8	RT
3P+N	A	S1	A	Pulse	A	5%	A	2s	A	3s	A	0min	A
1P+N	B	no Prio	B	Maint.	B	20%	B	0s	B	10s	B	3min	A
												10min	B
												30min	A
												30min	B

Programming through DIP switches is done using the 8 DIP switches on the front of the controller. Each DIP switch has positions A & B, by default all DIP switches are in position A.

When programming the dip switches with the switch powered off simply change the position of the DIP switches. To change the position of the DIP switches use a small screwdriver.

When programming the DIP switches with the controller powered on, switch to manual mode. When a DIP switch changed position the Fault LED will blink fast (3 Hz), to validate the change of the DIP switch press the **OK** button shortly (< 1 s). The Fault LED will stop blinking and the buzzer will sound twice. If instead of validating the DIP switch is brought back to the original position without pressing the **OK** button, the Fault LED will also stop blinking and the configuration will remain the same.

8.5.2. Voltage/Frequency Levels configuration

		1	2	3	4	5	6	7	8	OK			
		A	B	A	B	A	B	A	B				
1	Network	2	Prio set	3	Order mod	4	ΔU ΔF	5	ODT	6	FT	7-8	RT
3P+N	A	S1	A	Pulse	A	5%	A	2s	A	3s	A	0min	A
1P+N	B	no Prio	B	Maint.	B	20%	B	0s	B	10s	B	3min	A
												10min	B
												30min	A
												30min	B

Voltage and frequency levels can be configured through communication or DIP switch (DIP switch 4).

Configuration through DIP switch

The DIP switch configuration allows setting the voltage and frequency limits to 10 % of nominal voltage & 5 % of nominal frequency or 20 % of nominal voltage & 5 % of nominal frequency.

In both cases the hysteresis is 20 % of the selected value. The default value for nominal voltage is 230 VAC and the default value for nominal frequency is 50Hz.

To reboot the product press the **OK** button for 30 s, this will restart the product and take into account any changes on the DIP switches (even if the controller was in AUTO mode at the time of restart). In case of a configuration change the controller Buzzer will beep twice.

DIP Switch		
1. Network	A	Three phase network
	B	Single phase network
2. Prio Set	A	Priority source 1
	B	No priority
3. Order Mod	A	Control mode impulse logic
	B	Control mode contactor logic
4. $\Delta U/\Delta F$	A	Overvoltage setting at 10 % of nom voltage / over frequency setting 5 % of nominal frequency (hysteresis value is 20 % of $\Delta U/\Delta F$)
	B	Overvoltage setting at 20 % of nom voltage / over frequency setting 10 % of nominal frequency (hysteresis value is 20 % of $\Delta U/\Delta F$)**
5. ODT	A	Load supply down time of 2s (ODT = 2s)**
	B	Load supply down time of 0s (ODT = 0s)
6. FT	A	Wait time of 3s before source is lost (Fail timer = 3s)
	B	Wait time of 10s before source is lost (Fail timer = 10s)
7/8. RT	AA	Wait time of 0min (3s) before source returns (returnstimer = 0 min (3s))*
	AB	Wait time of 3min before source returns (returnstimer = 3 min)
	BA	Wait time of 10min before source returns (returnstimer = 10min)
	BB	Wait time of 30min before source is lost returns (returnstimer = 30min)

*When 0min is selected the return timer is set to 3 s

**When Control mode contactor is selected the minimum hysteresis is -15 %

8.6. Timers

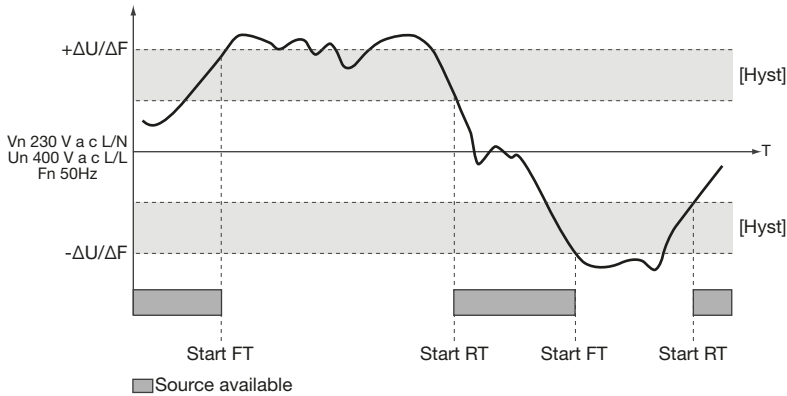
8.6.1. Fail timers and Return timers

Source failure timers FT and source return timers can be configured using the DIP switches.

The source fail timer FT is the time during which the source can be outside the voltage and frequency threshold before it is considered lost. (cf. graph below)

The source return timer is the time for which the source must be within the voltage and frequency threshold before it is considered available. (cf. graph below)

If only one source is present, the controller will give the order to switch to this source before the return timer has finished counting.



8.6.2. Cooldown timer

When the switch returns in position I the Cooldown timer will start counting (Default value 180 s) during the cooldown timer, the contacts will maintain the generator start signals.

8.6.3. Dead band timer ODT

The dead band timer ODT can be configured using the DIP switches 5 (2 s or 0 s). This timer defines the time for which the switch should stay in the 0 position when transferring from one source to another.

8.6.4. Priority settings

Priority settings can be configured using the DIP switch 2 "PRIO SET" or through communication.

The priority can be set to:

- S1, in this case when source 1 is available the controller will give the order to switch to position I
- No prio, if both sources are available the controller will give the order to remain in the current position.

8.6.5. Tests

HZI815 or HZI825 allows for 2 test functions using the HMI test button:



A short press on this button (< 3 s) will start a LED test, allowing the user to check that all LEDs are functional.

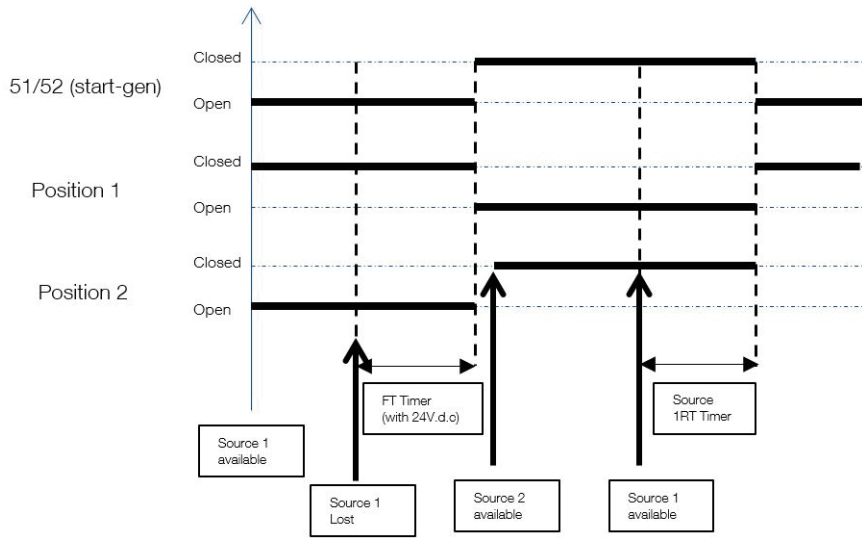
A long press (> 3 s) on this button will start a TEST ON LOAD, this test will start the genset, and transfer to the Source 2 once the source is considered available.

The product will remain on source 2 until the test ends, to end the test press again the test button for more than 3 s to return in the last working mode (Manual or Automatic).

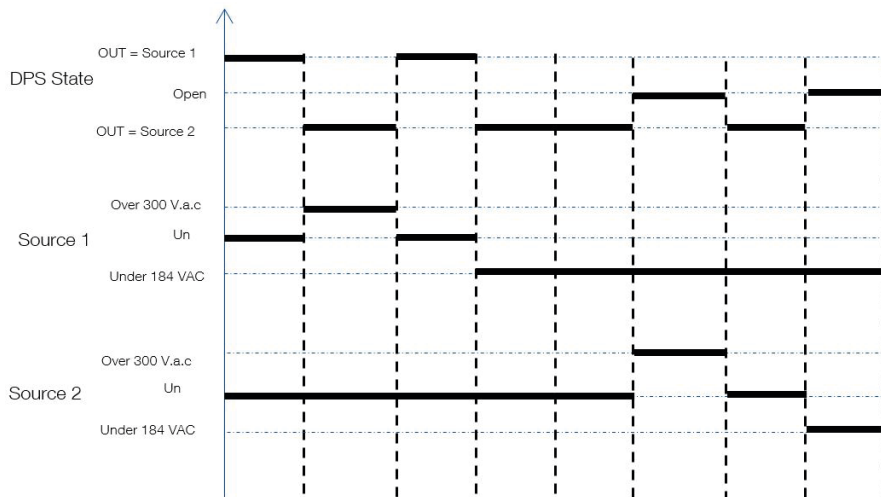
It is also possible to start and stop the test on load and off load through communication.

8.7. HZI815 or HZI825 operating sequence

Controller operating sequence with source 1 priority:



DPS Output operating sequence:




9. Characteristics

Electrical characteristics	
AC operating limits	184 - 300 VAC ⁽²⁾
Optional DC supply	24 VDC
Frequency limits	45 - 65 Hz
Power consumption	< 10 W
Inputs	5 - fixed (auto inhibit & 24 VDC fire input, position indication I-0-II)
Outputs	4 - fixed (position control I-0-II & genset start)
Impulse withstand	6/4 kV ⁽¹⁾
Overvoltage category	CAT 3
Mechanical characteristics	
Weight	845 g
Door cutout	138 x 92 mm
Operating temperature	-25 ... +60°C
Communications (only for HZI825)	
Interface type	RS485 - 2 to 3 half duplex wires
Protocol	MODBUS RTU
Baud rate	38 400

(1) 6 kV tested between phases of a different source and 4 kV tested between phases of a the same source.

(2) 200 - 300 VAC in contactor mode.

10. Preventive maintenance

	<p>WARNING Maintenance operation should be done by trained and qualified personnel using the appropriate protection equipment.</p>
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It is recommended to verify at least once a year the tightening torque of all connections and to operate the product in a full operating cycle (I – 0 – II – 0 – I: Auto and Manual) as well as tightening the door mounting clips and testing the LED's with the lamp test button when applicable.

In case of upstream protection tripping (fuse protection / Circuit breakers) make sure that the ATS remains functional by doing a functional test with the RTSE connected to the controller.

To clean the front face of the equipment, use a soft cloth with water and non-abrasive liquids.

Note: Maintenance should be planned carefully and carried out by qualified and authorized personnel. Consideration of the critical level and application where the product is installed should form an essential and integral part of the maintenance plan. Good engineering practice is imperative whilst all necessary precautions must be taken to ensure that the intervention (whether directly or indirectly) remains safe in all aspects.

11. Troubleshooting guide

Definition		Recommended action
Sources are not detected		<ul style="list-style-type: none"> - Verify that the product is correctly powered on using the power LED. - Verify that the DIP switch settings are corresponding to your installation.
Positions are not detected		<ul style="list-style-type: none"> - Verify that the position input cabling is correctly done.
Source LED are blinking		<ul style="list-style-type: none"> - Verify that the sources are in the voltage range configured through DIP switch or communication. - Verify that the sources are cabled correctly. - Verify that the phase rotation is identical on both sources.
Alarm LED is blinking	Long blinking	<ul style="list-style-type: none"> - Verify that Neutral of source I is connected to terminals 103/102 and that Neutral of source II is connected to terminals 203/202. Connected a Phase instead Neutral can damaged definitely the product. - Verify that the input 63A-64A is closed. - Verify that there has not been a problem during a transfer order and validate fault with the AUTO button.
	Short blinking	<ul style="list-style-type: none"> - Verify that the DIP switches have not changed position or validate the change of position using the OK button.
COM LED is on fixed(for HZI825 only)		<ul style="list-style-type: none"> - Verify that Communication settings are set according to your specification. - Press "OK" for 30 seconds to reset the Communication settings. - Contact Hager for other information.
DIP switch parameters are not taken into account		<ul style="list-style-type: none"> - Check if the alarm LED is blinking. - Verify that you are in manual mode when changing DIP switch parameters. - Press the "OK" button for less than 3s to validate the parameter change.

12. Annex I MODBUS communication address and designation details (only for HZI825)

All communication addresses, except communication parameters (4) are read only RO (read function 03/04).

The communication protocol adopts the standard MODBUS-RTU protocol, with master-slave acknowledgment connection (half duplex).

As standard the baud rate is set to 38400, parity bit to 1, Modbus address 3 these parameters can be changed through Modbus using the write function 10.

When the product is communicating the COM Led will blink.

12.1. Input / Output state

Dec. Address	Word count	Description	Unit
10008	1	Position I input state (70-71)	0 : OFF 1 : ON
10009	1	Position II input state (70-72)	0 : OFF 1 : ON
10010	1	Position 0 input state (70-73)	0 : OFF 1 : ON
10011	1	Fire Input state (F1-F2)	0 : OFF 1 : ON
10012	1	CTRL inhibit (63A-64A)	0 : Automatic 1 : Inhibit
10022	1	Genset control output: (51-52-54)	0 : Genset start order OFF 1 : Genset start order ON
10024	1	Control signal output 0 (16-17)	0 : Output not activated 1 : Output activated
10025	1	Control signal output I (15-17)	0 : Output not activated 1 : Output activated
10026	1	Control signal output II (14-17)	0 : Output not activated 1 : Output activated

12.2. Status

Dec. Address	Word count	Description	Unit
10124	1	Source 1 power status	0 : OFF 1 : ON
10125	1	Source 2 power status	0 : OFF 1 : ON
10040 ... 10071	32	Alarms 01 ... 32	0 : No alarm 1 : Alarm
40005	1	HZI825 operating mode	2 : Manual 3 : Automatic 4 : Test

12.3. Voltage sensing

Dec. Address	Word count	Description	Unit
10192	1	Source 1 L1-N voltage value	(V)
10193	1	Source 1 L2-N voltage value	(V)
10194	1	Source 1 L3-N voltage value	(V)
10195	1	Source 1 L-N average voltage	(V)
10196	1	Source 1 L1-L2 voltage value	(V)
10197	1	Source 1 L2-L3 voltage value	(V)
10198	1	Source 1 L3-L1 voltage value	(V)
10199	1	Source 1 L-L average voltage	(V)
10204	1	Source 1 frequency	(0.1 Hz)
10205	1	Source 2 L1-N voltage value	(V)
10206	1	Source 2 L2-N voltage value	(V)
10207	1	Source 2 L3-N voltage value	(V)
10208	1	Source 2 L-N average voltage	(V)
10209	1	Source 2 L1-L2 voltage value	(V)
10210	1	Source 2 L2-L3 voltage value	(V)
10211	1	Source 2 L3-L1 voltage value	(V)
10212	1	Source 2 L-L average voltage	(V)
10217	1	Source 2 frequency	(0.1 Hz)

12.4. Communication parameters

Dec. Address	Word count	Description	Unit
40017	1	HZI825 communication node address	1 ... 247
40018	1	Baud rate	2 : 2400 3 : 4800 4 : 9600 5 : 19200 6 : 38400
40019	1	Serial Data format	1 : 8N 2 : 8O 3 : 8E 4 : 7O 5 : 7E
40020	1	Stop bit	1 ... 2

As standard the baud rate is set to 38400, parity bit to 1, Modbus address 3 these parameters can be changed through Modbus using the write function 10.

Once the configuration is done, write data 1 at address Dec. 40565. After changing the parameters the product buzzer will sound twice and the Com LED will stay on.

To reset to default parameters press the  button for 30 seconds, the product will reboot and the standard communication settings will be set.

12.5. Maintenance

Dec. Address	Word count	Description	Unit
10126	2	Position I operation count in AUTO mode	0 ... 60 000
10128	2	Position II operation count in AUTO mode	0 ... 60 000
10130	2	Position I operation count in Manual mode	0 ... 60 000
10132	2	Position II operation count in Manual mode	0 ... 60 000
10170 ... 10179	8	Serial number	(V)
10186	1	Hardware version	(V)
10187	1	Software version	(V)