Installation, Operation and Maintenance Instructions

UNICON
UNHC 5–25
UNHC 30–40

FEEDER CONTROL UNIT

ERIEZ MAGNETICS HEADQUARTERS: 2200 ASBURY ROAD, ERIE, PA 16506–1402 U.S.A.
WORLD AUTHORITY IN SEPARATION TECHNOLOGIES

Introduction

This description contains the necessary information for the correct application of the product described below. It is intended for use by technically qualified personal.

Qualified personnel are persons who, because of their training, experience and position as well as their knowledge of appropriate standards, regulations, health and safety requirements and working conditions, are authorised to be responsible for the safety of the equipment, at all times, whilst carrying out their normal duties and are therefore aware of, and can report, possible hazards (Definition of qualified employees according to IEC 364)

Warning! Hazardous Voltage

Failure to observe can kill, cause serious injury or damage

The following instructions are provided for the personal safety of operators and also for the protection of the described product and connected equipment.

- **Isolate from mains before installation or dismantling work, as well as for fuse changes or post installation modifications.**
- **Observe the prescribed accident prevention and safety rules for the specific application.**
- **Before putting into operation check if the rated voltage for the unit conforms with the local supply voltage.**
- **Emergency stop devices must be provided for all applications. Operation of the emergency stop must inhibit any further uncontrolled operation.**
- **Electrical connections must be covered**
- **The earth connection must be checked, for correct function, after installation.**

Specified Use

The units described herein are electrical controllers for installation in industrial plant. They are designed for power adjustment on vibratory feed equipment.

Contact Eriez if you have a question regarding these precautions.

CAUTION

Safety labels must be affixed to this product. Should the safety label(s) be damaged, dislodged or removed, contact Eriez for replacement.

Table of Contents

UNICON HC 5–25, HC 30–40

General Description

Electronic control units for steplessly variable adjustment of vibratory feeders. The Unicon HC controllers are available as enclosed units for fitting directly next to feeding systems, or in a modular chassis construction for panel mounting. The control units are suitable for feeders with a vibrating frequency of 60 Hz and 50 Hz. The frequency is selected by using an internal switch on the printed circuit board. The feeder throughput can be adjusted by using either a potentiometer or analog signals 4...20 mA DC. An enable input is available for Stop/Start operation from a switch or a supervisory control system. Umin and Umax trimmers are provided to limit the throughput adjustment range.

An integral adjustable soft-start ramp reduces jolting when the unit is switched on or enabled.

With an additional acceleration sensor the controller can also be used in a closed loop system to regulate the deflection (vibrating amplitude) in case of weight change on the feeder or voltage fluctuations from the mains.

The enclosed version includes mains switch, start/ stop push buttons and throughput adjustment potentiometer in the front panel (manual / auto switch optional). The potentiometer can be used to set the feed rate from 0...100%.

The chassis mount version is designed for fitting into a separate enclosure.

NEMA 4/IP65

NEMA1/IP20
Chasis Mount

Technical Data

Model	Unit type	Unicon HC 5–25	Unicon HC 30–40
INPUT	Input voltage	115, 230, 400, 440, 460, 500, 600 VAC	
	Input frequency	50 or 60 (same as feeder)	
	Input current (Typ.)	Up to 25 A (refer to name tag)	Up to 40 A (refer to name tag)
	Earth leakage current	5.2 mA (at 600 V)	5.2 mA (at 600 V)
	Losses	60 VA	80 VA
OUTPUT	Output voltage*1	Max. 115, 230, 400, 440, 460, 500, 600 VAC	
	Output rated current	Max. 5–25 amps	Max 30–40 amps
	Output current range	0.2 ... 25 A	0.2 ... 40 A
	Unit output power*2	15 kVA	24 kVA
	Vibrating frequency*3	50/60 Hz	
CONTROL	Set point input voltage / current	4...20 mA DC Potentiometer 10 kOhm	
	Enable input	24 VDC or volt free contact	
	Remote control – NEMA 4	4…20 mA	
	Acceleration sensor input	For “SW 07”- sensor type 300 mV/g (max. 7 Vrms)	
ENVIRONMENT	Working temperature NEMA 1 / IP20	-10...+45°C	
	Working temperature NEMA 4 / IP65	-10…. +40°C	
	Working humidity	20 ~ 90% RH **non-condensing!**	
	Storage temperature	-40...+85 °C	
	Storage humidity	10 … 95 % RH	
SAFETY & EMC	Standards	EN 50178, EN61000-6-2, EN61000-6-4 IEC 60 664-1	
	Protection	open type IP 20 / NEMA 1	
		enclosure type IP 65 / NEMA 4	
	Withstand voltage	Input/Output – PE: 2500 VDC Control signals – Input/output: 2500 VDC	
	Isolation resistance	Input-PE, Output-PE: >1 MOhm / 500 VDC	
OTHERS	Dimensions (IP 20) HxWxD	300 x 220 x 100 mm (12 x 9 x 4 inch)	300 x 260 x 100 mm (12 x 10.25 x 4 inch)
	Dimensions (IP 65) HxWxD	400 x 354 x 268 mm (15.75 x 14 x 10.6 inch)	500 x 454 x 268 mm (19.7 x 18 x 10.6 inch)
	Weight IP 20 / NEMA 1	3.8 kg (8.4 lb)	4.2 kg (9.25 lb)
	Weight IP 65 / NEMA 4	14 kg (31 lb)	17.5 kg (38.5 lb)

1. Depend on input voltage and feeder power
2. Depend on input voltage
3. Depend on mains frequency

CE RoHS COMPLAINT

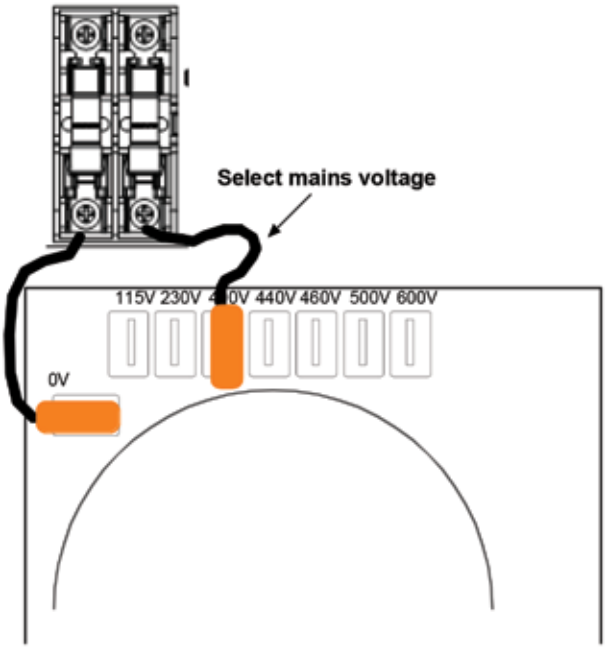
Voltage Selection

Mains Voltage Selector

IMPORTANT
BEFORE CONNECTING THE MAINS VOLTAGE

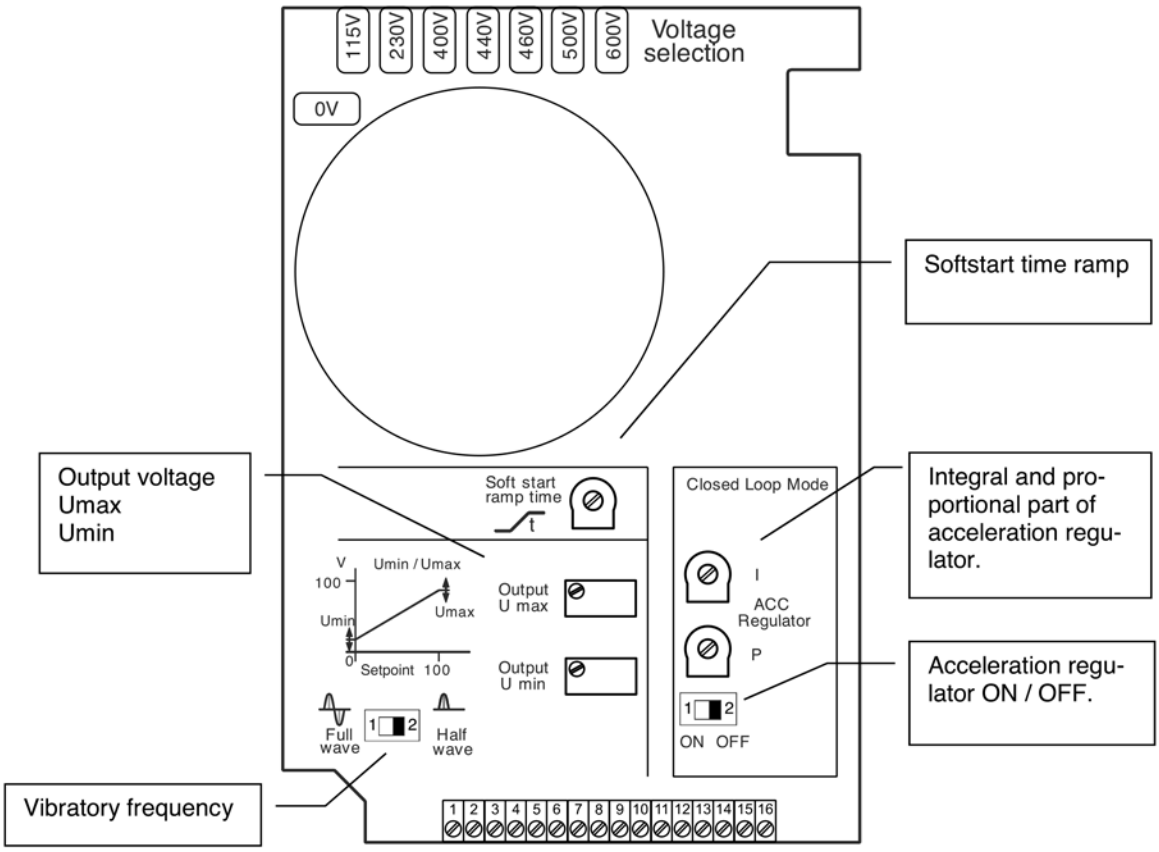
It is essential that the correct input voltage is manually selected by connecting the jumper to the mains voltage at site.

Failure to do this will result in damage to the controller.



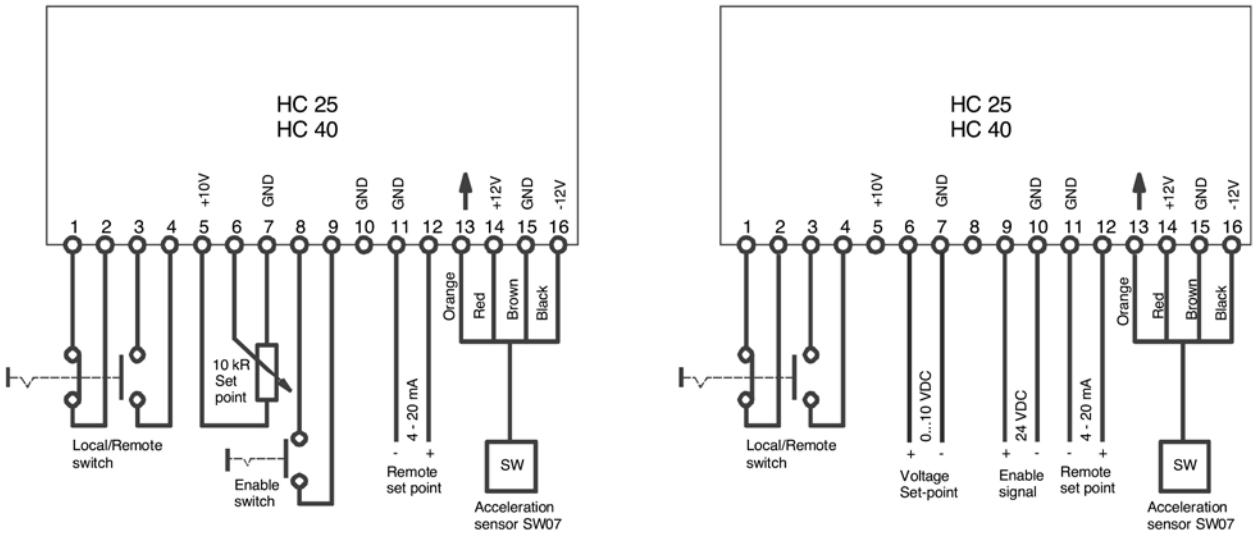
Control Overview

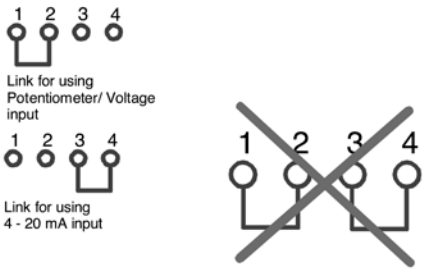
This diagram outlines the user adjustable functions and their position on the electronic control pcb.



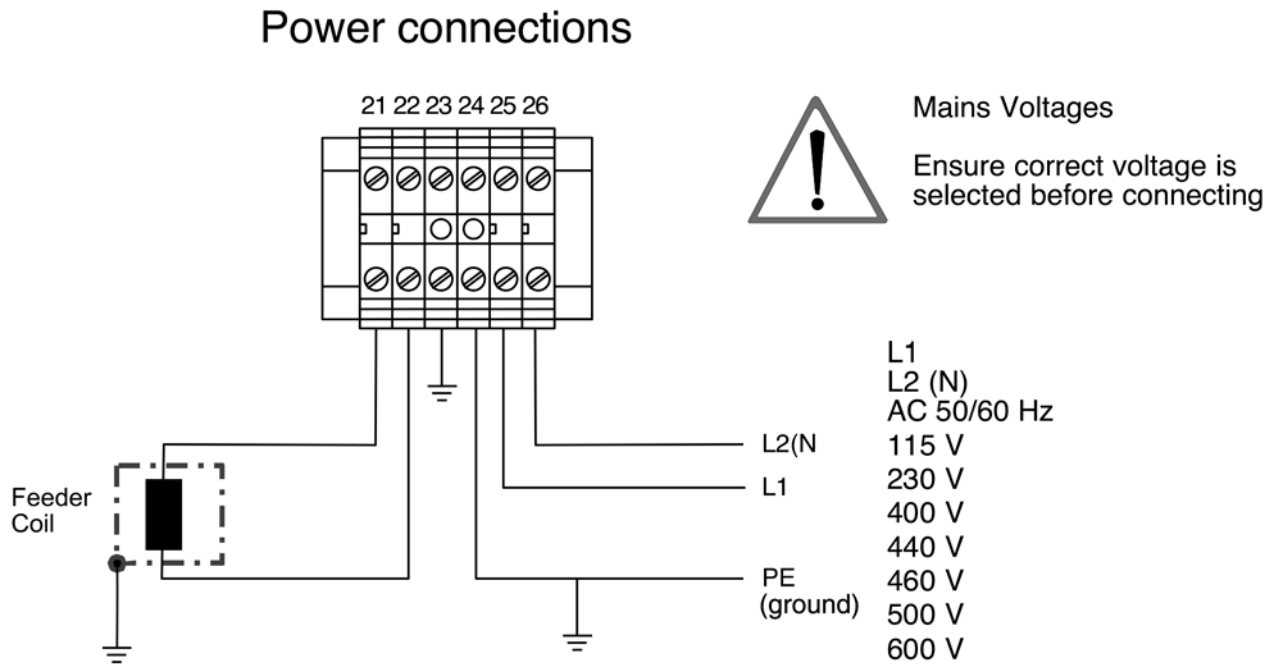
Connections IP20/ NEMA 1 Version

Control Connections



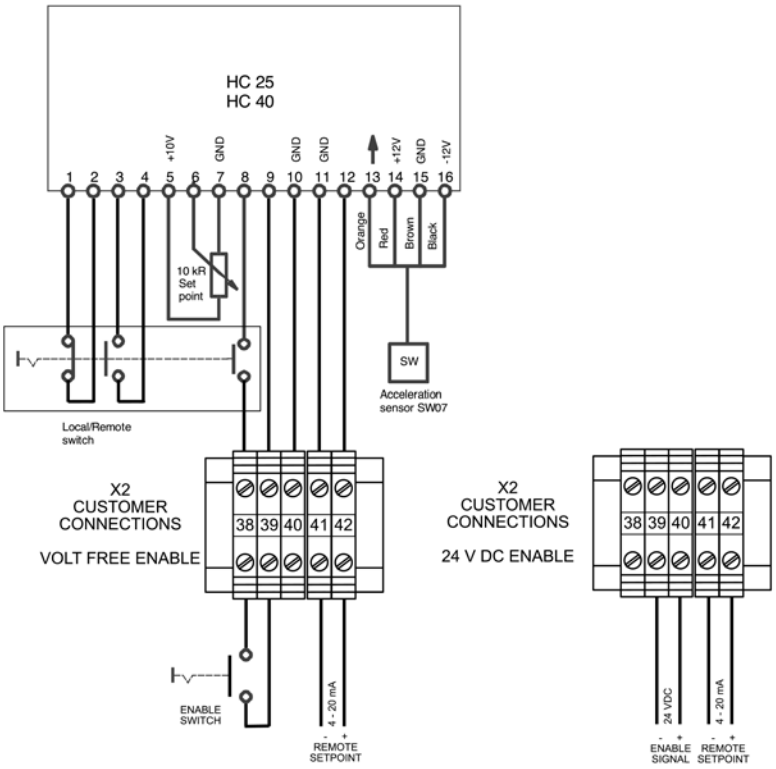


Power Connections
Feeder and Mains Input

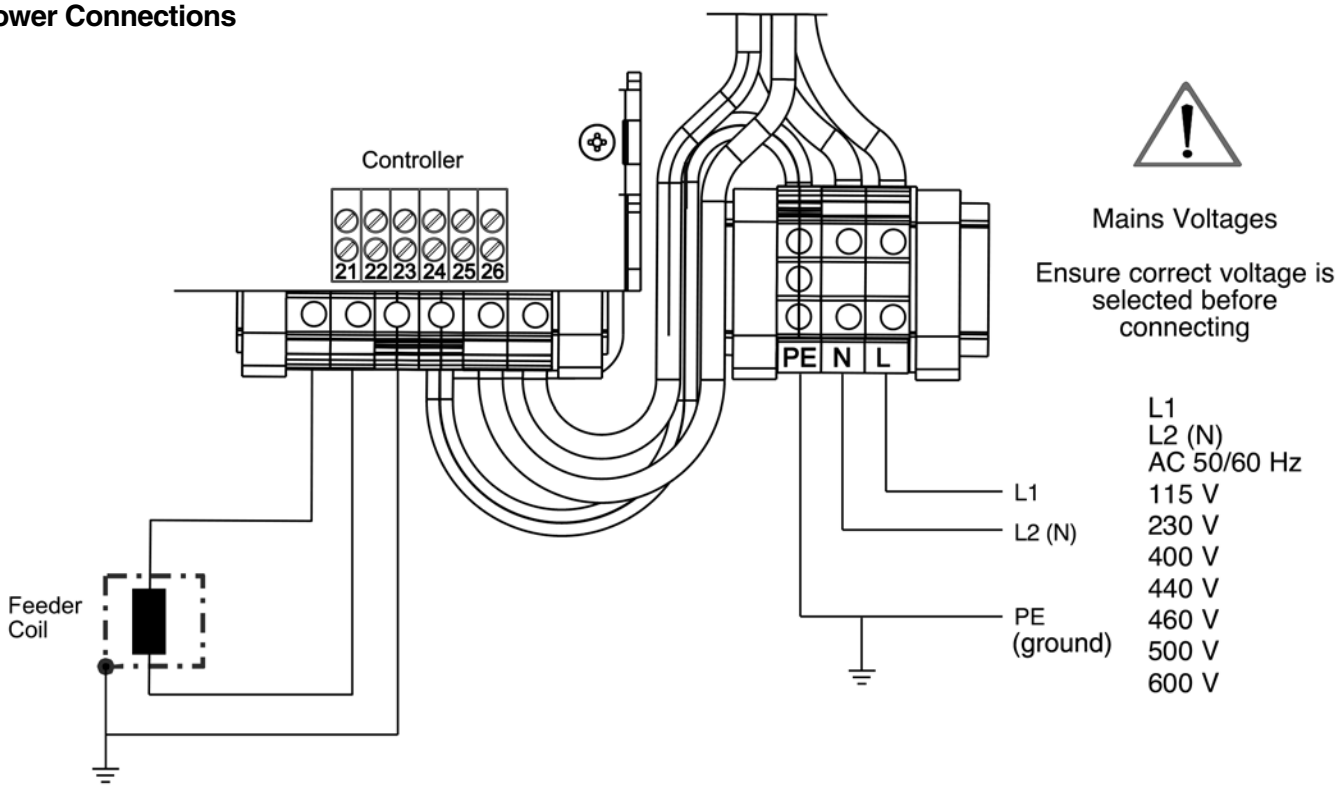


Connections IP65/ NEMA 4 version

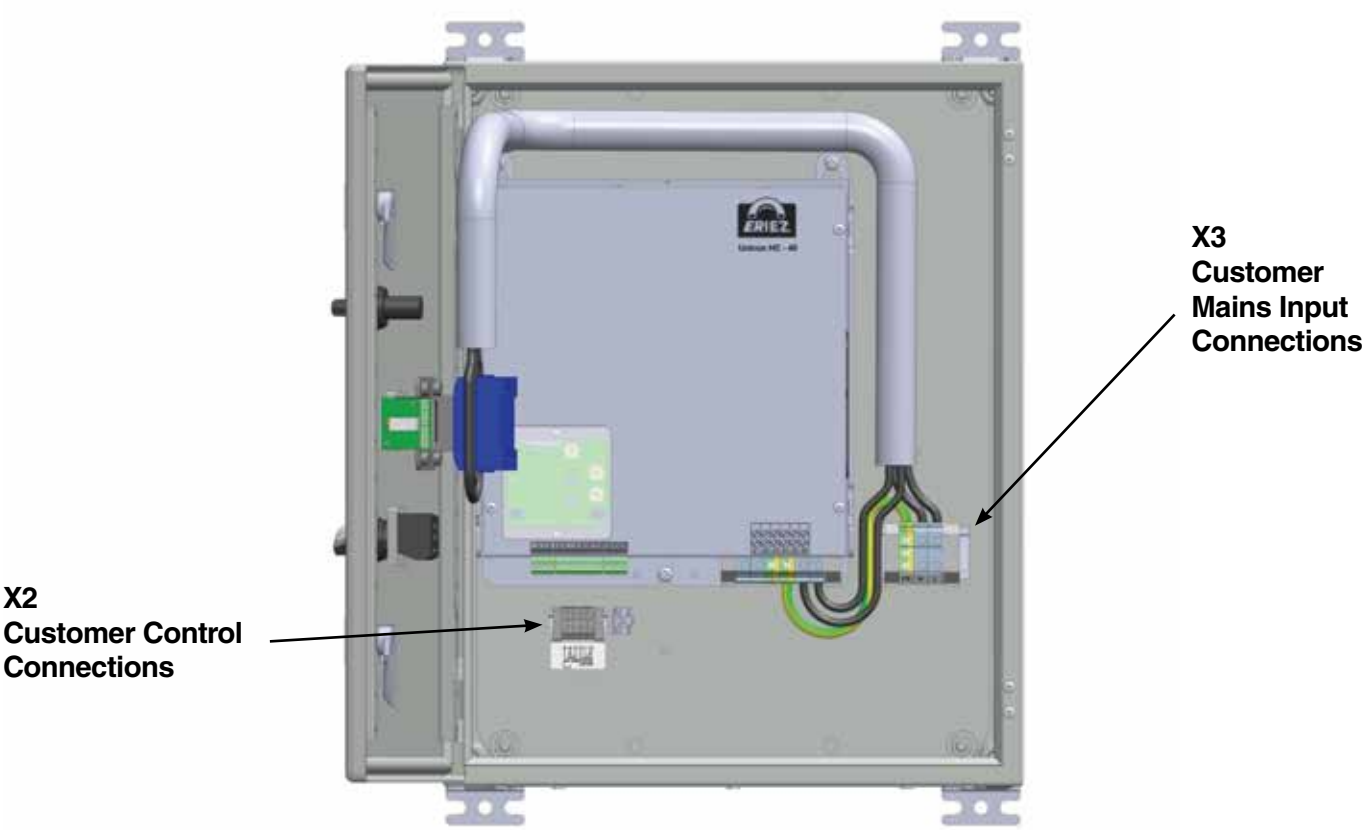
Control Connections



Power Connections



Enclosed version NEMA 4 (IP65)



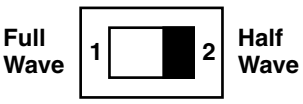
Function

The operating principle of the device is based on a controllable output voltage with thyristors in phase-angle mode. The devices can be operated with “full-wave”-mode or “half-wave”-mode, in “full wave”-mode both mains half-waves are used and in “half-wave”-mode only one half-wave is used. This frequency switching will be done with switch “S3”

Vibrating Frequency

In “half-wave”- mode, the mechanical frequency of the vibratory feeder is equal to the frequency of the input voltage.

Eriez feeders will operate in “full-wave”-mode, the mechanical frequency of the vibratory feeder is the frequency of the input voltage.

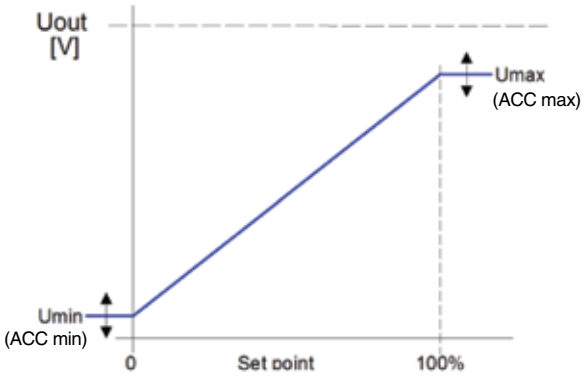


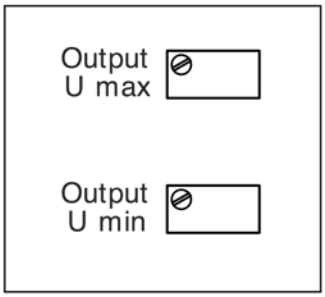
CAUTION
With use of an Eriez permanent magnet, Full wave must be set.

Setpoint

The “set point: feeder throughput” (0…100 %) can be adjusted by using either a potentiometer or analog signal,. 4...20 mA DC. Umin and Umax trimmers are provided to limit the throughput adjustment range.

The minimum output voltage (min feeder throughput): Umin (at set point zero) and the maximum output voltage (max feeder throughput): Umax (at 100% set point) can be adjusted to the different vibratory feeders via internal trimmer “Umin” / “Umax”.





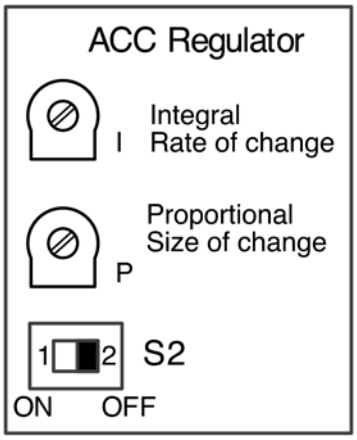
Acceleration Regulator

In addition, the controller is fitted with an acceleration control. Which allows to keep almost constant flow rate under varying amounts of product, product weights and mains voltage fluctuations.

To switch on the operating mode: “acceleration control” put switch “S2” in position 1.

In order to adapt the controller to the controlled system are each a trimmer for the “proportional part” and “integral part” available.

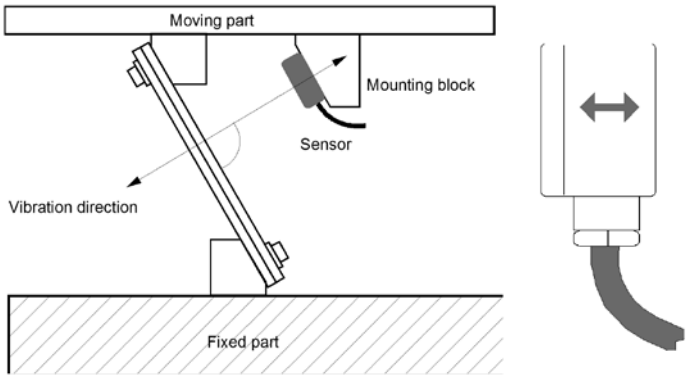
When the acceleration control is switched on (S2 = 1), the sensor must be connected. Without a connected sensor, the controller is locked internally.



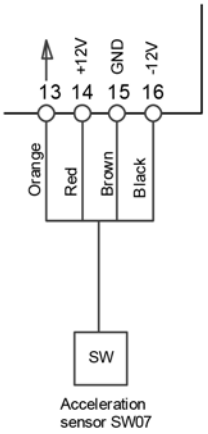
Mounting the Accelerometer

The accelerometer should generate signals for the movement and acceleration of the feeder, which are fed back to the regulator circuit of the control unit. Therefore it is very important that no other extraneous vibration signals are picked up by the sensor.

The sensor should be positioned, that it moves in the same direction as the feeder, ideally in the same plane as the springs (Check marking on the sensor). It should be fitted on a solid block that will not generate vibration signals.



Acceleration Sensor Connection



The connection of the accelerometer at Terminals 13, 14, 15 and 16

Acceleration Sensor Connection

The input for the acceleration sensor is for signals up to a maximum of + / - 10 V signal (peak values) or

7 Vrms, these values should not be exceeded even if overshoot of the vibratory feeder.

Sensors with a sensitivity of 300 mV / g are recommended, eg SW 07.

With this sensor are the following values reached:

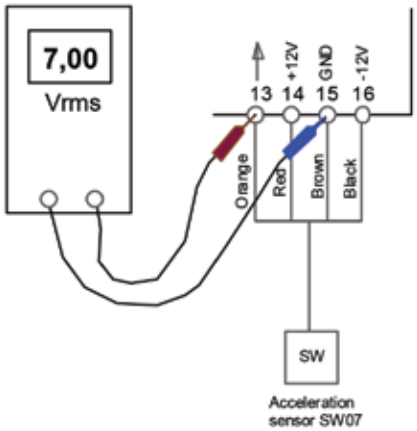
Mains Frequency (Hz)	Control Mode	Vibrating Frequency (Hz)	Vibrations Per Minute	Sticker Deflection	U Sensor [Vpp]	U Sensor [Vrms]	Acceleration [g]*
50	Full Wave	50	3000	0.060	2.3	1.6	7.7
60	Full Wave	60	3600	0.060	3.3	2.4	11

* The acceleration values are calculated values and are no guarantee that the vibratory feeder withstand mechanical stress.

The function of the sensor can be checked in standard mode (without acceleration control):

For this purpose, mount the sensor and connect it according to the wiring plan.

At the terminals 13 (signal) and 15 (GND), the acceleration signal may then be measured with a RMS meter or oscilloscope. The signal is dependent on the operating frequency and of the deflection of the vibratory feeder.



Maximum 7 Vrms!

Recommended value at maximum deflection is <4 Vrms

Startup of a Vibratory Feeder with Acceleration Control

Step 1: Without Acceleration Control

1. Selecting and setting of the operating voltage of the control unit for the given supply voltage and (bridge plug).
2. Mounting of the acceleration sensor on the moving part of the vibratory feeder in consideration of the moving direction.
3. Ensure that the supply cables are free of voltage!! Then connect the controller and acceleration sensor according to the wiring plan.
4. Set the vibratory frequency of the feeder at the controller with S3 (full wave / half wave).
5. Turn acceleration control off: S2 = 2.
6. Switch on the supply voltage
7. Take unit into operation. Adjust with the trimmers Umin / Umax: the minimum output voltage at set point “zero”, then set the maximum output voltage at set point 100%.
8. Adjust the soft start as required.
9. Measure the voltage at the sensor input, the voltage should be at 0 - 100% set point in the range 0 ... 4 Vrms.
   7 Vrms must not be exceeded!

Step 2: Activate Acceleration Control:

10. Set set point to “zero”
11. Turn acceleration control on: S2 =1,
    Trimmer I in position: (12 clock)
    Trimmer P in position: 9 clock
    Trimmer Umin in position: left stop (7 clock)
12. Increase set point, the vibratory feeder is now working in a control loop, the maximum throughput can be adjusted with the trimmer Umax (limited).

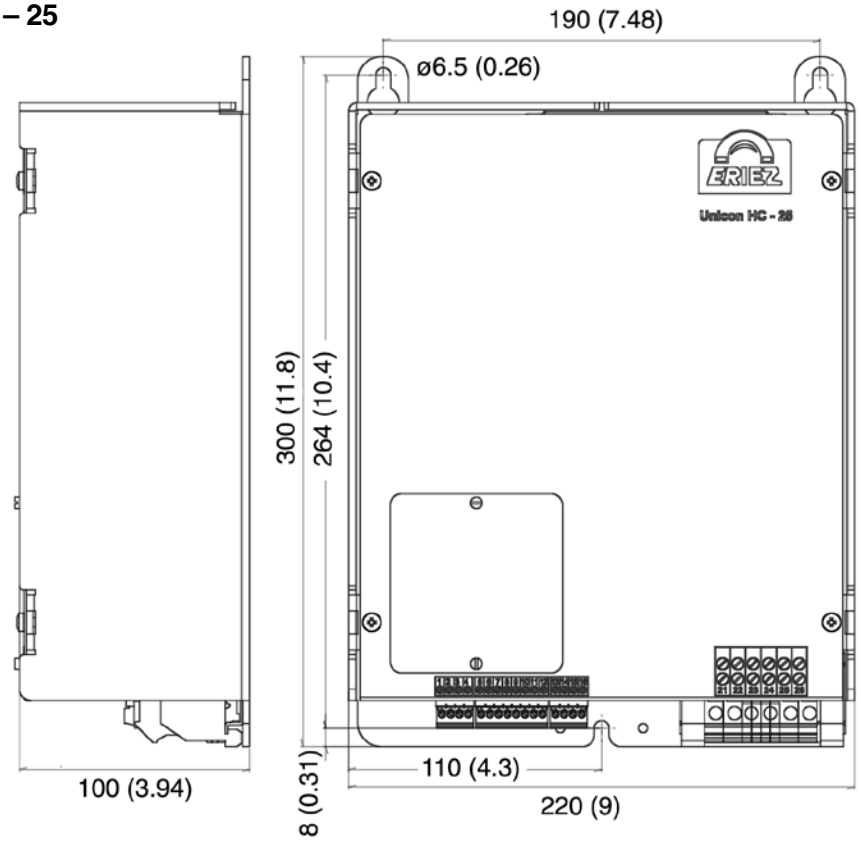
    A minimum throughput at set point zero can be set with trimmer Umin.
13. Adjust the regulation speed and regulation stability with the trimmer P and I. The settings depend on the particular vibratory feeder. Presetting as described under point 11, should be optimized first with the trimmer P then with the trimmer I.

Dimensions

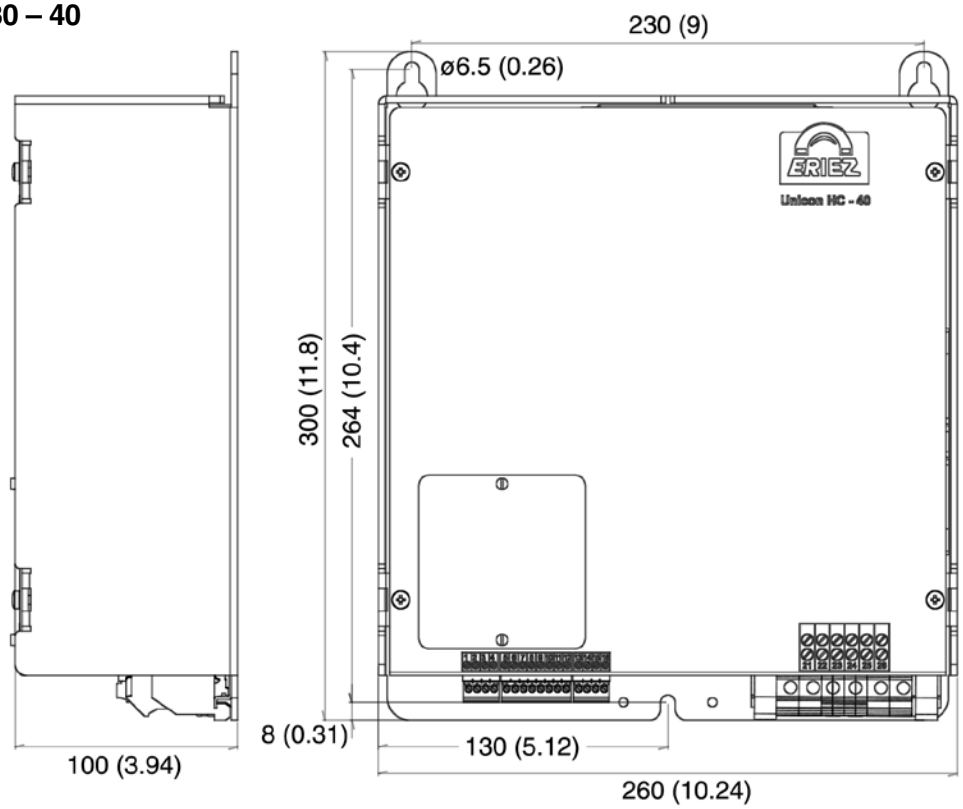
Panel mounting version NEMA (IP20)

Dimensions are in mm (Inches)

HC 5 – 25



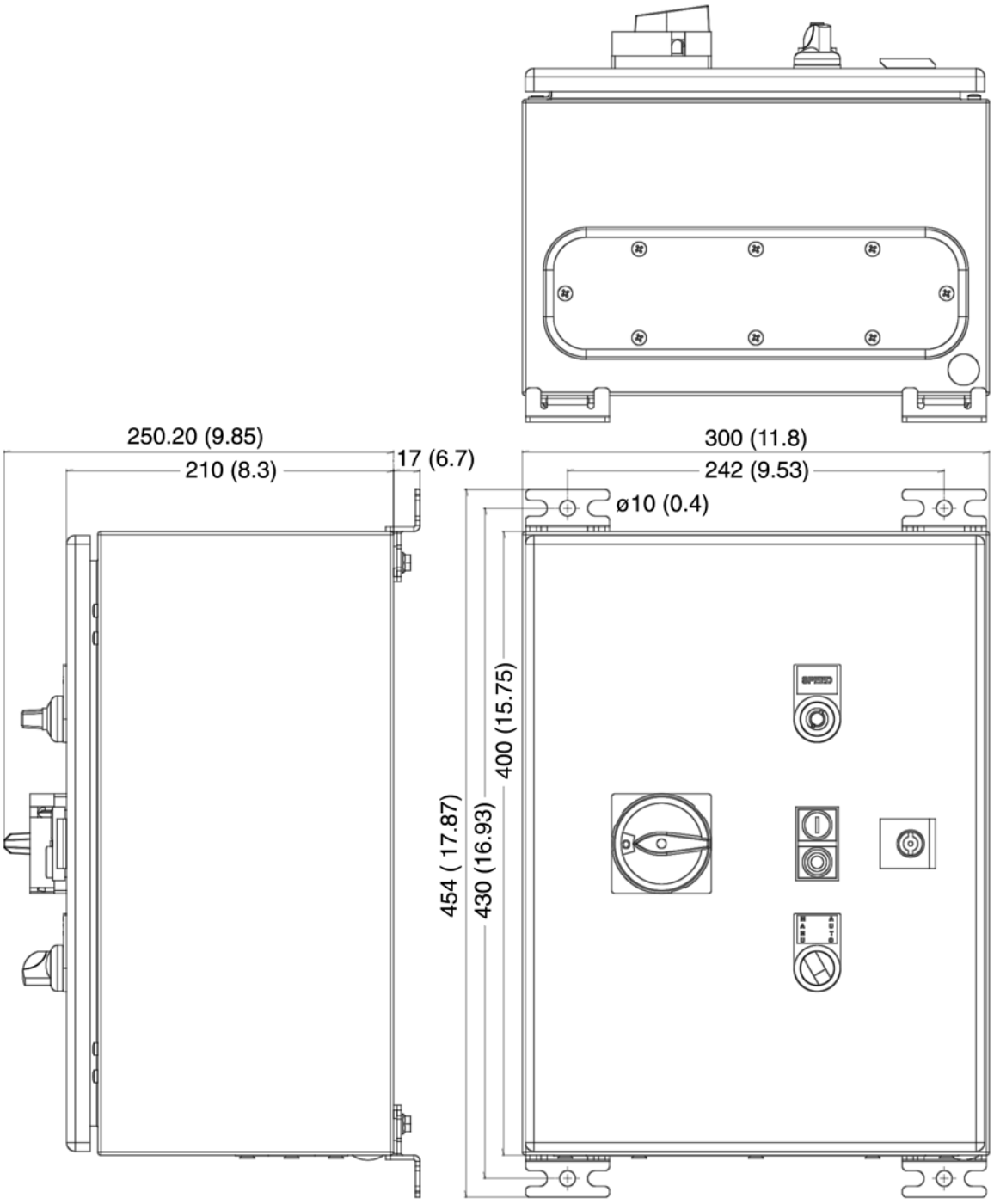
HC 30 – 40



Enclosed Version NEMA 4 (IP65)

HC 5 – 25

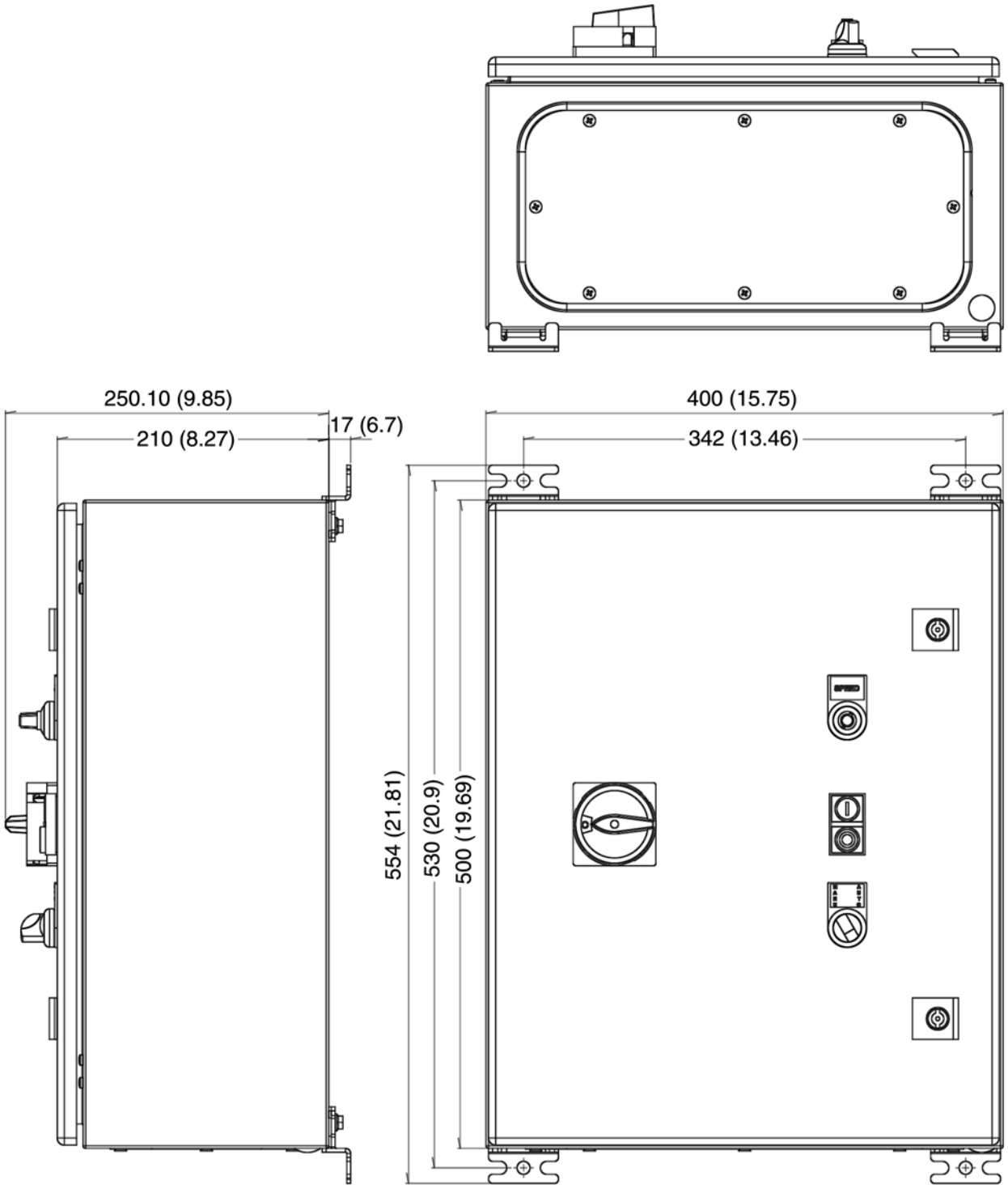
Dimensions are in mm (Inches)

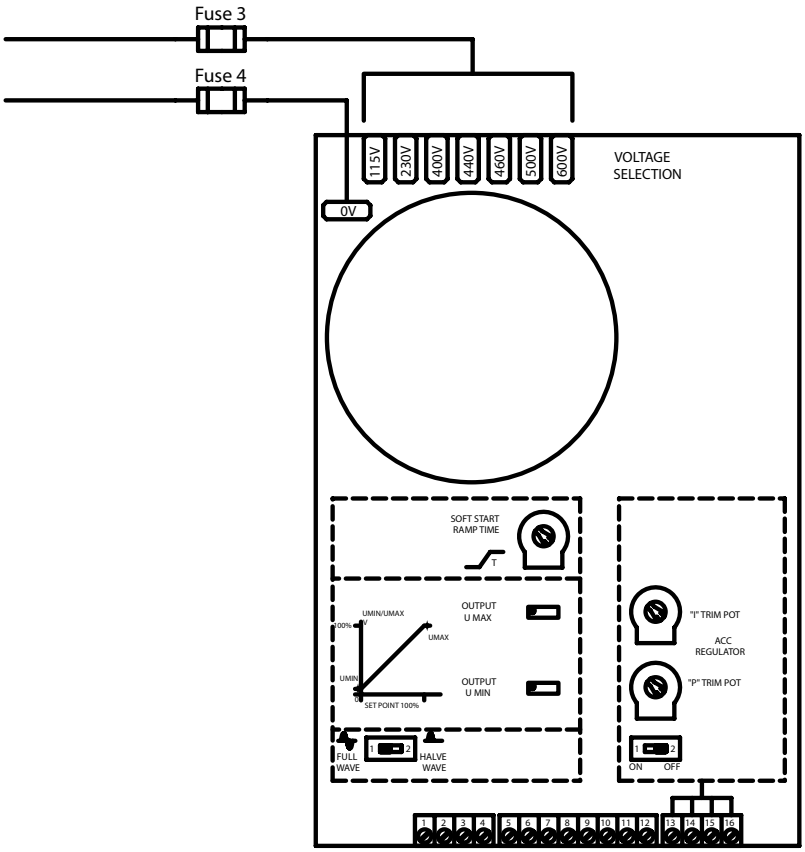


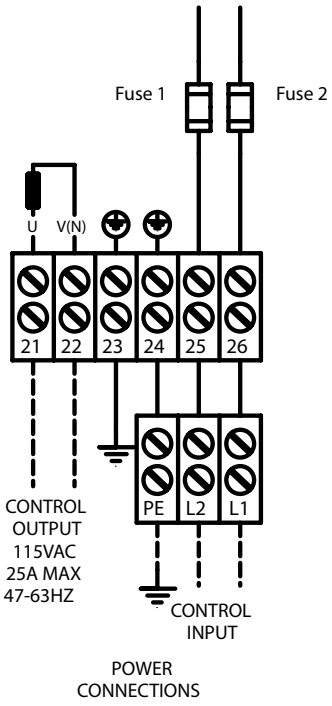
Enclosed version NEMA 4 (IP65)

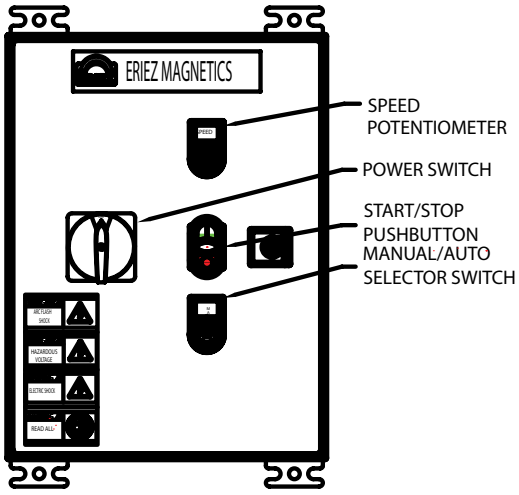
HC 30 – 40

Dimensions are in mm (Inches)




Fuse 3
Fuse 4
115V
230V
400V
440V
460V
500V
600V
VOLTAGE SELECTION
0V
SOFT START RAMP TIME
OUTPUT U MAX
OUTPUT U MIN
UMIN/UMAX
UMAX
UMIN
SET POINT 100%
"I" TRIM POT
ACC REGULATOR
"P" TRIM POT
FULL WAVE
HALVE WAVE
ON
OFF


Fuse 1
Fuse 2
U
V(N)
21
22
23
24
25
26
PE
L2
L1
CONTROL OUTPUT 115VAC 25A MAX 47-63HZ
CONTROL INPUT
POWER CONNECTIONS


ERIEZ MAGNETICS
SPEED POTENTIOMETER
POWER SWITCH
START/STOP PUSHBUTTON
MANUAL/AUTO SELECTOR SWITCH

Parts List

UNHC-115

(4N-201605993)

Part No.	Description	UNHC-115-40A	UNHC-115-35A	UNHC-115-30A	UNHC-115-25A	UNHC-115-20A
		Required				
453027	Fuse F1, F2					2
468430	Fuse F1, F2				2	
452711	Fuse F1, F2			2		
452744	Fuse F1, F2		2			
468431	Fuse F1, F2	2				
468438	Fuse F3, F4	2	2	2	2	2
472190	Control PCB	1	1	1	1	1
472191	Main Power Switch				1	1
472192	Main Power Switch	1	1	1		
472193	Speed Potentiometer	1	1	1	1	1
472197*	Start/Stop Push Button	1	1	1	1	1
472199*	Start/Stop Push Button PCB	1	1	1	1	1
472102	Accelerometer (option)	1	1	1	1	1
472194**	Auto/Manual Switch M22-WKV	1	1	1	1	1
472195**	Auto/Manual Switch Relay M22-K10	1	1	1	1	1
472196**	Auto/Manual Switch Relay M22-K01	1	1	1	1	1

* Make-up complete start/stop push button switch

** Make-up complete auto/manual switch

Parts List

UNHC-230

(4N-201606093)

Part No.	Description	UNHC-230-40A	UNHC-230-35A	UNHC-230-30A	UNHC-230-25A	UNHC-230-20A
		Required				
453027	Fuse F1, F2					2
468430	Fuse F1, F2				2	
452711	Fuse F1, F2			2		
452744	Fuse F1, F2		2			
468431	Fuse F1, F2	2				
468438	Fuse F3, F4	2	2	2	2	2
472190	Control PCB	1	1	1	1	1
472191	Main Power Switch				1	1
472192	Main Power Switch	1	1	1		
472193	Speed Potentiometer	1	1	1	1	1
472197*	Start/Stop Push Button	1	1	1	1	1
472199*	Start/Stop Push Button PCB	1	1	1	1	1
472102	Accelerometer (option)	1	1	1	1	1
472194**	Auto/Manual Switch M22-WKV	1	1	1	1	1
472195**	Auto/Manual Switch Relay M22-K10	1	1	1	1	1
472196**	Auto/Manual Switch Relay M22-K01	1	1	1	1	1

* Make-up complete start/stop push button switch

** Make-up complete auto/manual switch

Parts List

UNHC-380

(4N-201606108)

Part No.	Description	UNHC-380-40A	UNHC-380-35A	UNHC-380-30A	UNHC-380-25A	UNHC-380-20A	UNHC-380-15A	UNHC-380-10A	UNHC-380-5A
		Required							
452709	Fuse F1, F2								2
452710	Fuse F1, F2							2	
472071	Fuse F1, F2						2		
453027	Fuse F1, F2					2			
468430	Fuse F1, F2				2				
452711	Fuse F1, F2			2					
452744	Fuse F1, F2		2						
468431	Fuse F1, F2	2							
468438	Fuse F3, F4	2	2	2	2	2	2	2	2
472190	Control PCB	1	1	1	1	1	1	1	1
472191	Main Power Switch				1	1	1	1	1
472192	Main Power Switch	1	1	1					
472193	Speed Potentiometer	1	1	1	1	1			
472197*	Start/Stop Push Button	1	1	1	1	1			
472199*	Start/Stop Push Button PCB	1	1	1	1	1			
472102	Accelerometer (option)	1	1	1	1	1			
472194**	Auto/Manual Switch M22-WKV	1	1	1	1	1			
472195**	Auto/Manual Switch Relay M22-K10	1	1	1	1	1			
472196**	Auto/Manual Switch Relay M22-K01	1	1	1	1	1			

* Make-up complete start/stop push button switch

** Make-up complete auto/manual switch

Parts List

UNHC-460

(4N-201606159)

Part No.	Description	UNHC-460-40A	UNHC-460-35A	UNHC-460-30A	UNHC-460-25A	UNHC-460-20A	UNHC-460-15A	UNHC-460-10A	UNHC-460-5A
		Required							
452709	Fuse F1, F2								2
452710	Fuse F1, F2							2	
472071	Fuse F1, F2						2		
453027	Fuse F1, F2					2			
468430	Fuse F1, F2				2				
452711	Fuse F1, F2			2					
452744	Fuse F1, F2		2						
468431	Fuse F1, F2	2							
468438	Fuse F3, F4	2	2	2	2	2	2	2	2
472190	Control PCB	1	1	1	1	1	1	1	1
472191	Main Power Switch				1	1	1	1	1
472192	Main Power Switch	1	1	1					
472193	Speed Potentiometer	1	1	1	1	1			
472197*	Start/Stop Push Button	1	1	1	1	1			
472199*	Start/Stop Push Button PCB	1	1	1	1	1			
472102	Accelerometer (option)	1	1	1	1	1			
472194**	Auto/Manual Switch M22-WKV	1	1	1	1	1			
472195**	Auto/Manual Switch Relay M22-K10	1	1	1	1	1			
472196**	Auto/Manual Switch Relay M22-K01	1	1	1	1	1			

* Make-up complete start/stop push button switch

** Make-up complete auto/manual switch

Parts List

UNHC-575

(4N-201606173)

Part No.	Description	UNHC-575-40A	UNHC-575-35A	UNHC-575-30A	UNHC-575-25A	UNHC-575-20A	UNHC-575-15A	UNHC-575-10A	UNHC-575-5A
		Required							
452709	Fuse F1, F2								2
452710	Fuse F1, F2							2	
472071	Fuse F1, F2						2		
453027	Fuse F1, F2					2			
468430	Fuse F1, F2				2				
452711	Fuse F1, F2			2					
452744	Fuse F1, F2		2						
468431	Fuse F1, F2	2							
468438	Fuse F3, F4	2	2	2	2	2	2	2	2
472190	Control PCB	1	1	1	1	1	1	1	1
472191	Main Power Switch				1	1	1	1	1
472192	Main Power Switch	1	1	1					
472193	Speed Potentiometer	1	1	1	1	1			
472197*	Start/Stop Push Button	1	1	1	1	1			
472199*	Start/Stop Push Button PCB	1	1	1	1	1			
472102	Accelerometer (option)	1	1	1	1	1			
472194**	Auto/Manual Switch M22-WKV	1	1	1	1	1			
472195**	Auto/Manual Switch Relay M22-K10	1	1	1	1	1			
472196**	Auto/Manual Switch Relay M22-K01	1	1	1	1	1			

* Make-up complete start/stop push button switch

** Make-up complete auto/manual switch

Agency Approvals

CE Compliance

The standard Unicon HC controls, enclosed and chassis mount, are CE compliant under the Low voltage and EC Electromagnetic Compatibility directives and are also RoHS compliant.

UL/CSA Certification

The standard Unicon HC controls, enclosed and chassis mount, are UL and CSA certified for the U.S. and Canadian markets.

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