
**IRDH204MYX
AGH505S
IREH1900S**



Insulation monitor for ungrounded three phase systems
up to AC 1000 V, 50...400 Hz

Edition 02.86

Technical Manual
TGH 1146



Table of Contents:

1. General Application
2. Ordering Details
- 2.1 A-ISOMETER IRDH204MYX
- 2.2 High tension coupler AGH505S
- 2.3 Off line insulation monitor IREH1900S
3. Functional Description
- 3.1 Insulation monitor IRDH204MYX + AGH505S
- 3.2 Off line insulation monitor IREH1900S
4. Design Description
- 4.1 A-ISOMETER IRDH204MYX
- 4.2 High tension coupler AGH505S
- 4.3 Off line insulation monitor IREH1900S
5. Technical Data
- 5.1 A-ISOMETER IRDH204MYX + AGH505S
- 5.2 Off line insulation monitor IREH1900S
6. Installation Instructions
- 6.1 General
- 6.2 A-ISOMETER IRDH204MYX + AGH505S
- 6.3 Off line insulation monitor IREH1900S
7. Maintenance and Service
- 7.1 By operating personnel
- 7.2 By trained electrical personnel
- 7.3 Repairs
8. Spare Parts
9. Connection and Dimension Diagrams

1. General Application

The A-ISOMETER IRDH204MYX in combination with coupling unit AGH505S are used for the insulation monitoring of ungrounded three phase systems up to AC 1000 V, 50...400 Hz to ground. The system may contain various DC supplied loads, for example high power thyristor-controlled DC drives and frequency converters up to DC 700 V.

The insulation monitor type IREH1900S is used for off line monitoring for approx. three DC systems, when they are switched off (deenergized).

The insulation monitor IRDH204MYX, high tension coupler AGH505S and the off line insulation monitor can be used in areas with extrem climatical, environmental and mechanical conditions, e.g. mines.

2. Ordering Details

2.1 A-ISOMETER

IRDH204MYX	Art.No. 914569
Supply voltage	AC 50...400 Hz, 230/120/42 V

2.2 High tension coupler

AGH505S	Art.No. 914569
Mains voltage	AC/3 AC 50...400 Hz, 0...1000 V

2.3 Off line insulation monitor

IREH1900S	Art.No. 912553
Supply voltage	AC 50...60 Hz, 42 V
Mains voltage	DC 0...700 V

3. Functional Description

3.1 Insulation monitor IRDH204MYX + AGH505S

The A-ISOMETER IRDH204MYX in combination with coupling unit AGH505S are used for the insulation monitoring of ungrounded three phase systems up to AC 1000 V, 50...400 Hz to ground. The system may contain various DC supplied loads, for example high power thyristor-controlled DC drives and frequency converters up to DC 700 V.

A "PULSE CODE" measuring voltage is superimposed on the complete network via the high tension coupling unit.

An insulation fault between the network and ground completes the measuring circuit. An electronic evaluation circuit calculates the insulation resistance which is displayed on built in and/or external ohmmeters after a time delay dependent on system capacitance.

During short voltage variations, the measuring data is automatically suppressed and the last reading is stored until the next correct measuring can be made. The ohmmeter output provides a 0...1 mA signal which can be used for external ohmmeters or measuring recorders in series connection.

If the reading is below the selected response value, the output relay K1H either deenergizes (NC operation) or energizes (NO operation). To obtain "Fail safe conditions" factory setting is NC operation.

The ground fault alarm LEDs will indicate

"DC + ground fault"

"DC - ground fault"

"Symmetrical DC ground fault or AC ground fault".

The insulation monitor display the combined value of all insulation faults and path to ground in parallel, whether they occur in the AC or DC system. The DC circuits are monitored only when a current > 3mA flows through the rectifying diodes, thyristors or transistors. Selective fault location is possible if DC voltage is above 60 V. The insulation monitor has to be adjusted to the system capacitance to ground, which is adjustable from 1...20 uF. Dependent on this setting there is a time delay for to display the exact insulation value of the system, e.g. 1 uF setting and 100 kOhm insulation fault causes a 35 sec. time delay.

In Addition to this the insulation monitor has an integrated fast response time fault indication system which allows to indicate single pole ground fault conditions as follows:

System voltage	Insulation fault	Reponse Time
Ac system voltage 500...1200 V	<60 kOhm	<1,5 sec.
DC system voltage 200 V	< 1 kOhm	<1,5 sec.
DC system voltage 700 V	<100 kOhm	<1,5 sec.

Other values, see diagram "Response value/Response time".

The fast response will always be indicated by the red LED "Symmetrical DC ground fault or AC ground fault". After the measuring time delay the ohmmeter will display the exact insulation level to ground.

The ground fault indication may be reset by the built in combined test and reset button if the ohmmeter reading exceeds the selected response value by 25%. The terminals LT1 and LT2 at the insulation monitor remain disconnected if fault indication are not to be stored. The combined test and reset button allows the function of the insulation monitor to be tested.

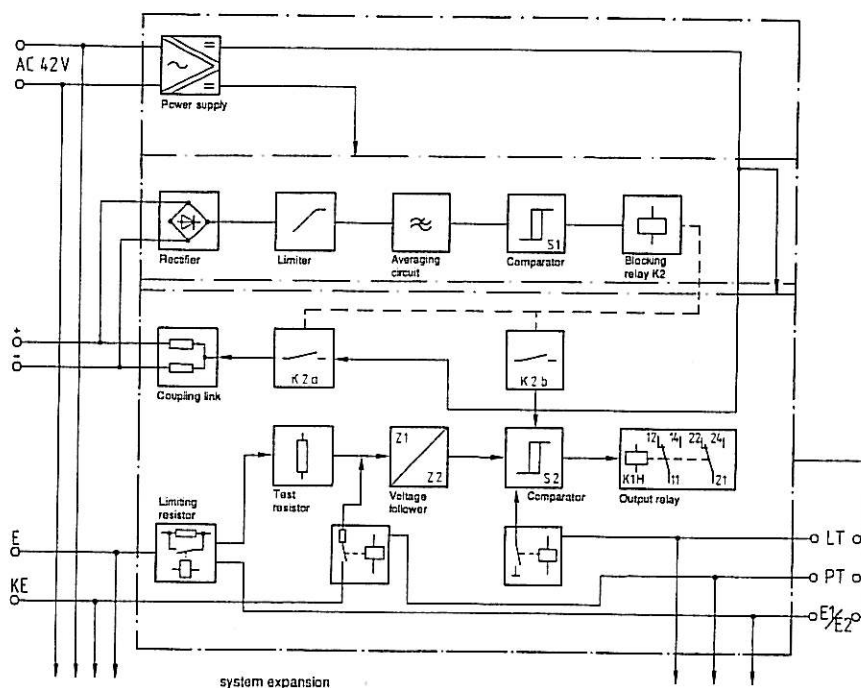
3.2 Off line insulation monitor IREH1900S

The off line insulation monitor IREH1900S is designed of three identical measuring units plus an additional circuit, as described in bloc diagram Z 160026.

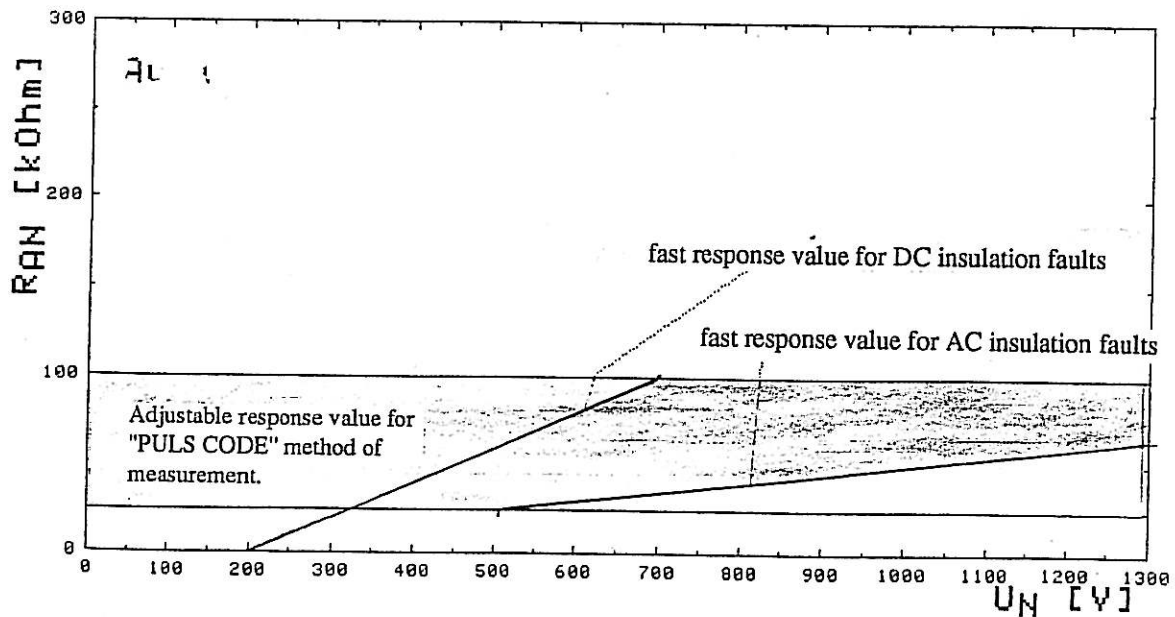
The supply voltage AC 42 V is converted into two galvanically separated DC voltages. One of those is supplying the interlocking circuitry whereas the other one is supplying the insulation measuring circuitry. The interlocking circuitry consists of a rectifier, voltage and current limiter, average value converter, threshold sensor and an interlocking relay. The insulation monitoring circuitry consists of coupling links, internal resistors, measuring resistor, impedance converter, threshold sensor and an output relay.

Any voltage at the measuring terminals + and - will be rectified, independent from polarity, and limited to a preset value. This voltage will be cleaned by the voltage average-converter and passed to the threshold sensor S2. If the monitored voltage is below 5 V the threshold sensor S1 will energize the interlocking relay. The measuring voltage will be now superimposed to the network to be monitored via the relay contact K2a and the coupling links. The measuring circuit is completed by the insulation resistance via terminal E and the internal measuring resistance. This creates a DC current to flow proportional to the insulation resistance which causes a voltage drop at the internal measuring resistor. This voltage will be passed through the impedance converter to the threshold sensor S2 which will cause the output relay to deenergize if the voltage reaches the adjusted response value. The ground fault indication may be reset by the built in combined test and reset button if the insulation value exceeds the selected response value by 25%. The terminals LT1 and LT2 at the insulation monitor remain disconnected if fault indication are not to be stored. The combined test and reset button allows the function of the insulation monitor to be tested.

If the voltage at the measuring terminals + and - is in a range of 5...700 V the interlocking relay K2a will be deenergized and the measuring voltage is disconnected from the network to be monitored. The threshold sensor S2 will be interlocked by relay contact K2b.



Response value diagram for
fast response value for DC insulation faults
fast response value for AC insulation faults



4. Design Description

4.1 A-ISOMETER IRDH204MYX

The unit is fitted in a series 200 plastic case suitable for quick assembly on a supporting rail 1 3/8" and for direct screw-in panel mounting.

The PCBs are completely sealed with a protective polymer coating. All components are secured to PCB with vibration resistant fastening.

The frontplate contains a combined test and reset button, three fault indication LEDs and a potentiometer for the steplessly adjustable response value.

The three red LEDs are used for the following fault indication:

- "DC+ ground fault"
- "DC- ground fault"
- "Symmetrical DC ground fault or AC ground fault".

The ohmmeter output provides a 0...1 mA signal which can be used for external ohmmeters or measuring recorders in series connection.

4.2 High tension coupler AGH505S

The unit is completely encapsulated in an epoxy resin bloc for surface mounting within the switchgear compartment.

4.3 Off line insulation monitor IREH1900S

The unit is built into a custom made housing and completely encapsulated in epoxy resin. Two connecting cables are provided for field wiring.



5. Technical Data

5.1 A-ISOMETER IRDH204MYX + AGH505S

Electrical data		Switching components	
Rated isolation voltage	AC 1000 V	Switching capacity	two free change over contacts
Isolation class according to	ASTM1207-89	Rated contact voltage	max. 33 W, 1100 VA
Test voltage	AC 4000 V	Permanent current	AC 230 V
Operation class	permanent operation	Break capacity	5 A
Rated mains voltage V_N via coupling unit AGH505S		at AC 230 V and $\cos. \phi = 0,4$	3 A
Operating range of V_N		at DC 110 V and $L/R = 0$	0,3 A
Net capacitance to ground		Operating principle	NC or NO operation
Operating range of directly connected DC circuits		Adjustment by factory	NC operation
Supply voltage V_s		Other data	
Operating range of V_s		Admissible temperature	
Max. self consumption		when operating	
Measuring voltage V_M		when stored	
Measuring current I_M		Tests according to IEC 255-4	
DC internal resistance R_i		Impulse voltage strenght	
Impedance at 60 Hz Z_i		HF noise resistance	
Response value R_{AN} (adjustable)		Vibration resistance	
Factory setting		Type of connection	
Response time delay t_{AN} for		Wire cross section	
Response value R_{AN} 100 kOhm and net capacitance setting 1 uF		single wire	
Fast response time AC system voltage 500...1200 V		fine braid with end sleeve	
DC system voltage 200 V		Casing	
DC system voltage 700 V		Behaviour in fire according to	
Other values, see diagram		Fixing	
		Protection class according to UL 508	
		Weight	
		IRDH204MYX	
		AGH505S	
		Installation	
		Wiring diagram	

5.2 Off line insulation monitor IREH1900S (Data for each individual system)

Rated isolation voltage	AC 700 V	Tests according to IEC255-4	
Isolation class according to	ASTM1207-89	Impulse voltage strenght	class III
Test voltage	AC 3000 V	HF noise resistance	class III
Operation class	permanent operation	Vibration resistance	1/32", 55 Hz
Rated mains voltage V_N	DC 700 V	Type of connection	terminal screws
Operating range of V_N	0...1,2 x V_N		M 3,5 with self lifting clamp-washers
Net capacitance to ground	approx. 1 uF	Wire cross section	
Supply voltage V_s	AC 50...60 Hz 42 V	single wire	14 AWG
Operating range of V_s	0.8...1,15 x V_s	fine braid with end sleeve	16 AWG
Max. self consumption	4 VA	Mechanical design	electronic encapsulated in epoxy resin
Measuring voltage V_M	DC 12 V	Wiring harness 3`	8 x 16 AWG
Measuring current I_M	max. 8,6 uA	Wiring harness 3`	24 x
DC internal resistance R_i	1,4 MOhm	Protection class according to UL 508	type 2
Interlocking of measuring circuit	>5 V DC	Weight	5,1 lb
Response value R_{AN} (selectable)		Installation	indifferent
E1	25 kOhm	Wiring diagram	Z 120265
E2	50 kOhm		
Response delay t_{AN}	<1,5 sec.		
Switching components	two free change over contacts		
Switching capacity	max. 33 W, 100 VA		
Rated contact voltage	AC 230 V		
Permanent current	5 A		
Break capacity			
at AC 230 V and cos. phi = 0,4	3 A		
at DC 110 V and L/R = 0	0,3 A		
Operating principle	NC or NO operation		
Adjustment by factory	NC operation		
Admissible temperature			
when operating	23 F...122 F		
when stored	-14 F...140 F		



6. Installation Instructions

6.1 General

The units have to be installed in accordance with the required protection class. The relevant standards and specifications have to be considered.

6.2 A-ISOMETER IRDH204MYX + AGH505S

A functional test is recommended before system start up to ensure proper connection and operation of the units.

Please observe correct nominal voltage.

Only one insulation monitor can be connected per galvanically isolated system. Units must be isolated from the circuit before insulation or voltage tests are carried out.

Each unit is supplied with terminal covers for protection against electric shock. If these covers are not used, alternative protective measures must be observed.

6.3 Off line insulation monitor IREH1900S

In a disconnected circuit the conductors must be coupled via low resistance, e.g. motor windings, to ensure correct kOhm readings. The insulation monitor will measure the insulation resistance only of a switched off (deenergized) circuit (voltage below 5 V).

Off line insulation monitoring on semicontrolled thyristor bridges (rectifiers continuously partwise open) is not possible.

7. Maintenance and Service

7.1 By operating personnel

The devices are designed to be "service free". No maintenance or services have to be carried out.

7.2 By trained electrical personnel

All accessible components can be replaced if necessary.

7.3 Repairs

Extensive repairs should be carried out at bender's authorized repair centers.

8. Spare Parts

8.1 A-ISOMETER IRDH204MYX

	Art. No.
Terminal screws	449001

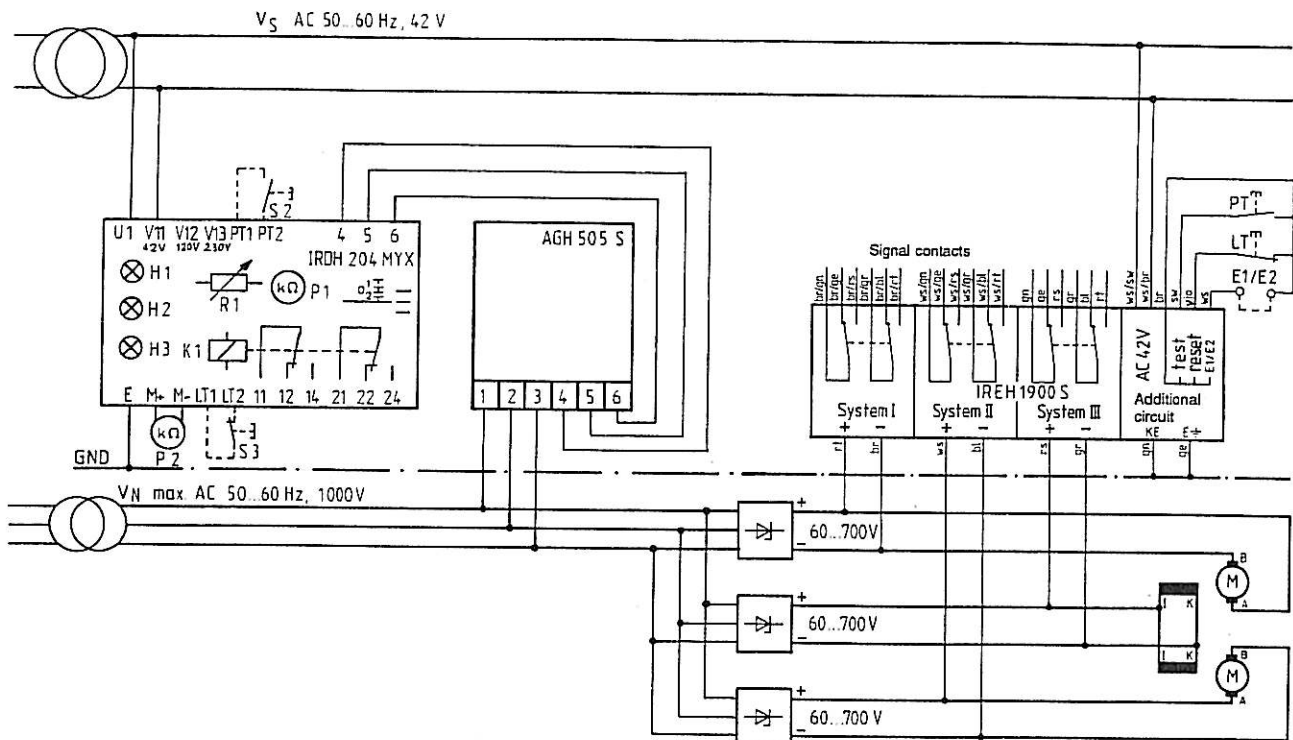
8.2 High tension coupler AGH505S

	Art. No.
High voltage terminal	370069
High voltage terminal cover UHSH/S2000	371041
Terminal D-UHSK2000	370024
Terminal cover UK5	371022
End holder	371014
Supporting rail	372007

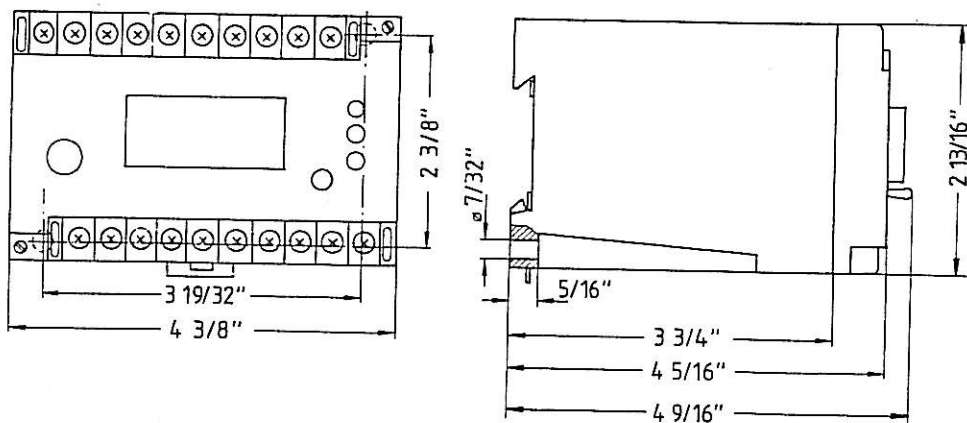
8.3 Off line insulation monitor IREH1900S

Not available, because of epoxy resin encapsulation.

Wiring diagram Z 120 265

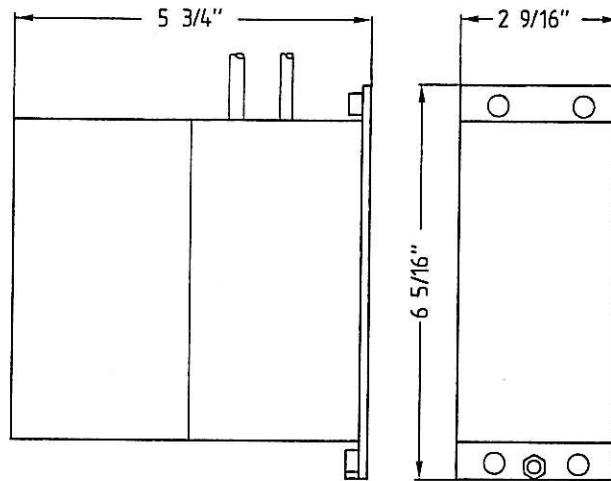


Dimension diagram IRDH204MYX Z 150 599

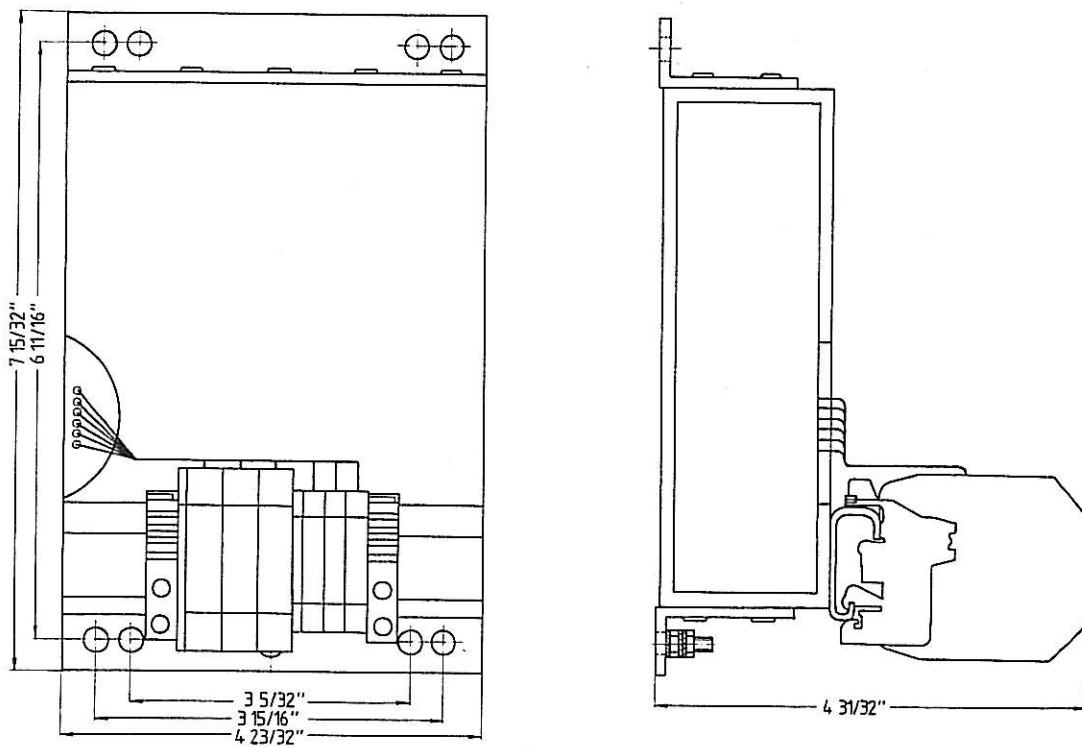




Dimension diagram IREH1900S Z 150 593



Dimension diagram AGH505S Z 150 612

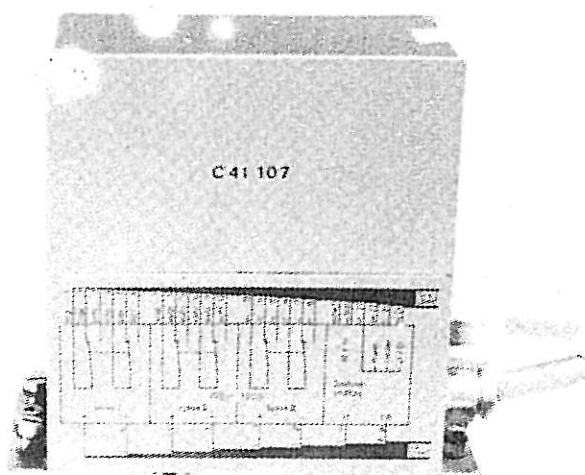




IRDH204MYX



IREH1900S



AGH505S