



Refrigerated Serve over counter

A89 SM 1,0-1	
A89 SV 1,0-1	
AC87 SM 1,0-1	
AC87 SV 1,0-1	
A90 SV 1,0-2	

OPERATION MANUAL



TABLE OF CONTENTS

	Page
Introduction	
1. General Information	
1.1. Product purpose	3
1.2. Specifications	3
2. Nameplate data	
2.1. Scope of delivery	4
2.2. Acceptance certificate	5
2.3. Warranty obligations	5
3. Intended use	
3.1. General instructions	6
3.2. Safety precautions	6
3.3. Product installation	7
3.4. Operation procedure	7
3.5. Troubleshooting	7
3.6. Storage regulations	8
3.7. Transportation	8
3.8. Guidelines on removal and disposal of waste and environmental protection	8
4. Maintenance	
4.1. General instructions	8
5. Appendices	
5.1. Appendix A. Certificate of putting into operation (Form)	10
5.2. Appendix B. Technical evaluation report (Form)	11
5.3. Appendix C. Controller programming parameters	12

INTRODUCTION

This Operation Manual is intended to get acquainted with the device, installation and operation regulations for the refrigerated display.

Installation, precommissioning, and maintenance of the display case must be performed only by the service centers of suppliers or retailers of refrigeration equipment of **Company "Polus", JSC** or other enterprises working on behalf of the manufacturer.

This Operation Manual includes nameplate data.

Warning! Before putting the product into operation, study the Operation Manual. The Manual must be accessible for the user during the whole lifetime of the product.

1. GENERAL INFORMATION

1.1. PRODUCT PURPOSE

Refrigerated displays (hereinafter display cases) are intended for short-term storage and selling of food products precooled down to the temperature of the refrigerated enclosure at retail and food service facilities.

Display cases are intended for operation in the self-ventilated closed space at ambient temperature of 12°C to 25°C and relative humidity of up to 60%.

1.2. SPECIFICATIONS

Main specifications of display cases are presented in Table 1.

Table 1. Specifications of refrigerated displays.

Display case brand	Net volume, m ³	Refrigerated area, sq. m	Net volume temperature □C	Set total capacity, kW	Energy consumption per 24-hour day, kW/h, not more	Overall dimensions, mm, without protruding parts			Net weight, kg, not more
						length	width	height	
A89 SM 1,0-1	0.05	0.5	+2 ÷ +8	0.2	3.0	1000	882	410	49
A89 SV 1,0-1	0.05	0.5	-5 ÷ +5	0.35	3.5	1000	882	410	50
AC87 SM 1,0-1	0.05	0.5	+2 ÷ +8	0.2	3.0	1000	870	410	63
AC87 SV 1,0-1	0.05	0.5	-5 ÷ +5	0.35	3.5	1000	870	410	64
A90 SV 1,0-2	0.05	0.54	-5 ÷ -2	0.3	4.0	1000	890	300	43

Notes:

1. Refrigerant type: R134a, its quantity is specified on the data plate
2. Power Supply System: 1/N/PE 230V 50 Hz.

Electrical schematic

Electric schematic diagram is shown in Fig. 1 and 2.

ATTENTION! The manufacturer reserves the right to make minor changes to the electric schematic diagram of the unit which do not impair its operation, without any notice.

LEGEND OF THE ELECTRICAL SCHEMATIC DIAGRAM:

- A1 - controller
- SA1 - key switch
- SA2 - lighting key switch
- MC - compressor electric motor
- MVC - condenser fan motor
- S1 - temperature sensor of refrigerated enclosure
- XP - power cord plug
- TV - power adapter 24W, 12VDC
- LA - LED strip light LED 3528/60 SMD 4,8W 12VDC

Fig. 1. Electric schematic diagram of the Refrigerated Display A89 (AC87) SM (SV)

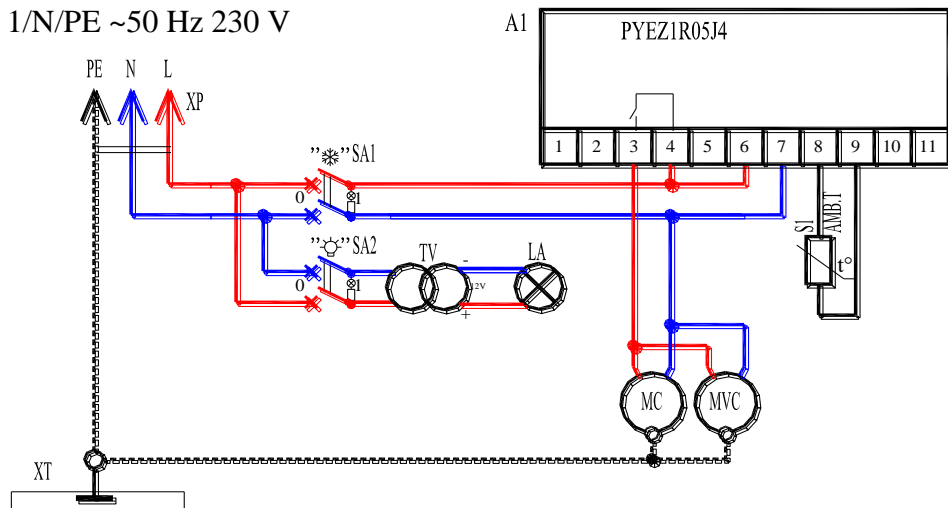
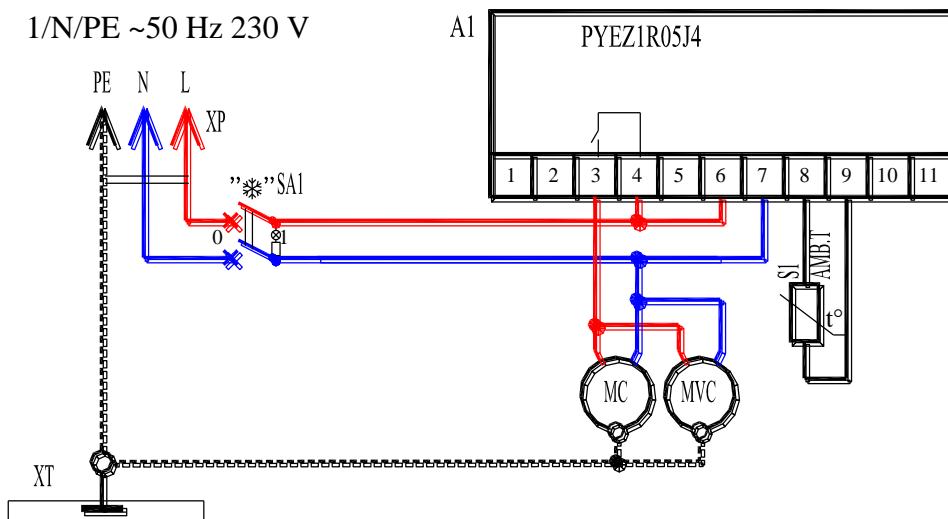


Fig. 2. Electric schematic diagram of the Refrigerated Display A90 SV 1,0-2.



2. NAMEPLATE DATA

2.1. SCOPE OF DELIVERY

The Scope of Delivery is presented in table 2.

Table 2. Scope of delivery.

Name	Quantity, pieces				
	A89 SM 1,0-1	A89 SV 1,0-1	AC87 SM 1,0-1	AC87 SV 1,0-1	A90 SV 1,0-2
Refrigerated display	1				
Operation manual	1				
The displace case is supplied with removable components					
Condensate discharge tray	1				
Shelf	-		1		-
Leaf	2				-
Channel	2				-

2.2. ACCEPTANCE CERTIFICATE

Seal

2.3. WARRANTY OBLIGATIONS

The manufacturer guarantees conformance of the display case to specification requirements 5151-002-80055133-20107 "Refrigerated displays. Specifications", provided that transportation, storage, installation, and operation conditions and regulations specified in the Operation Manual are observed.

Warrantied service life of the refrigerated display is 12 months from the date of putting into operation, but not more than 18 months from the date of manufacture.

Warrantied storage life is 6 months from the date of manufacture.

Total average service life of the display case is at least 12 years, provided that the installation and operation regulations are complied with.

The warranty is only valid if the following documentation is available:

- Operation Manual;
- Certificate of Putting into Operation (form in Appendix A);
- Technical Evaluation Report (form in Appendix B);
- Maintenance Contract with a specialized company authorized by the equipment supplier

(vendor).

The warranty obligations are performed by the authorized organization (the Supplier or Vendor) and their service centers.

If the authorized organization (the Supplier or Vendor) refuses to perform its warranty repair obligations, you may seek information support from Company "Polus", JSC by e-mail: sales@oaopolus.ru.

The warranty obligations are not performed if:

- the transportation, storage and operation regulations and safety measures specified in the Operation Manual are not complied with;
- precommissioning, routine maintenance of the product is performed by a company which does not have the required authorization to perform such work;
- structural changes to the display case (installation or replacement of parts or installation of additional parts not manufactured or not approved by Company "Polus", JSC) were made without the manufacturer's written approval;
- display case serial number is removed, unreadable or changed;
- there is a defect as a result of outside impacts and the reasons beyond the manufacturer's control, such as:
 - deviation from standard power supply parameters (deviation of current frequency from the rated one - more than 0.5%; voltage beyond the range of 220V + 10%, - 15%);
 - natural disasters, fire, external objects, liquids, animals or insects getting into the working units and devices;
 - mechanical damage to the frame, glass, and adjustable supporting legs.

The warranty obligations not cover the consumables (light lamps, starters, and chokes) and the installation, adjustment and maintenance work specified in this Operation Manual.

The manufacturer reserves the right to make modifications to the structure or manufacturing process which do not imply the obligations to change or improve any devices manufactured earlier.

These warranty obligations do not limit the statutory consumer rights.

Please contact the authorized companies (Suppliers or Vendors) or their service centers regarding any matters related to maintenance and spare parts purchase.

3. INTENDED USE

3.1. GENERAL INSTRUCTIONS

This Operation Manual contains the information required for proper operation and maintenance of the display case during its direct use.

The service life of the product and its operational safety depends on compliance with the operation regulations.

3.2. SAFETY PRECAUTIONS

The product meets the safety requirements according to Customs Union Technical Regulations TR CU 004/2011 "On Safety of Low Voltage Equipment" (Decision of Commission of the Customs Union No. 768 dated August 16, 2011), Customs Union Technical Regulations TR CU 010/2011 "On Safety of Machinery and Equipment" (Decision of Commission of the Customs Union No. 823 dated October 18, 2011), and Customs Union Technical Regulations TR CU 020/2011 "Electromagnetic Compatibility of Technical Equipment" (Decision of Commission of the Customs Union No. 789 dated December 09, 2011).

In terms of protection against electric shock, the product belongs to protection class I according to GOST IEC 60335-1.

Protection degree of equipment provided by enclosures is IP20.

This appliance is not intended for use by persons (including children) with impaired physical, sensory or mental capabilities, or lack of experience or knowledge, unless they are supervised or have been given instruction concerning the use of the appliance by the person responsible for their safety. Keep children away from playing with the product.

DO NOT STORE EXPLOSIVE SUBSTANCES AND OBJECTS SUCH AS AEROSOL SPRAY-CANS WITH FLAMMABLE MIXTURES INSIDE THE PRODUCT.

WARNING! The device must be connected to the supply network via the dual protection automatic switch.

Display case power cord must be plugged into the socket with grounding contact which is connected with supply mains earth wire.

DO NOT CONNECT THE DISPLAY CASE VIA THE EXTENSION CORDS WITHOUT EARTH WIRE OR IF WIRE CROSS-SECTION IS LESS THAN 1.5 SQ. MM.

WARNING! Damaged power cord ПBC-БП can be replaced only by the maintenance (repair) service or similar qualified person.

DO NOT OPERATE THE DISPLAY CASE WITH CRACKED OR BROKEN GLASS.

Failure to comply with the above requirements waives the manufacturer's responsibility for electrical safety.

In case of any malfunctions in the electrical part (wire insulation fault, broken grounding wire etc.), the operating personnel must immediately shut the product down pulling the power cord plug out of the socket and call for a mechanical engineer.

IT IS ABSOLUTELY FORBIDDEN FOR THE OPERATING PERSONNEL TO REPAIR AND ADJUST THE REFRIGERATING UNIT.

WARNING! When dismantling and repairing the refrigeration system elements, do not allow the refrigerant to leak into atmosphere.

3.3. PRODUCT INSTALLATION

Unpack the product, check the scope of delivery.

Normal operation requires installation of the display case at least 2 m away from the heaters. Do not operate the display case under direct sunlight, air flow from air conditioners, fans and heaters.

SOME PARTS HAVE PROTECTIVE COVERING (FILM) WHICH CAN BE REMOVED IF NEEDED.

Wash internal and external surfaces of the display case with a neutral detergent and dry with a soft cloth.

3.4. OPERATION PROCEDURE

WARNING! After the display case was transported or stored at freezing temperatures, keep it at room temperature (not less than 12°C) for 24h. The connection of the cold device to the net may lead to compressor locking and device failure.

Plug the power cord into the socket.

Install the key switches located on display case control panel into position '1'. After this, the indicator lamps of the switches should light up, the display case lighting turn on and the luminous signs on the controller display flash. In 5 seconds, the display shall show the current temperature in the interior volume. The user can set the required temperature in the interior volume on the controller display. Other controller parameters are set at the manufacturing plant. To change them, it is necessary to call for the refrigerating equipment operation and repair serviceman.

After starting the unit, and upon reaching the desired temperature, load the display case with the products precooled down to the internal enclosure temperature. The height of product display for demonstration must not be more than 100 mm (for BXCp-1,0 Apro XL TEHNO self – not more than 60 mm).

ATTENTION! The glass shelf must be used for displaying the products which do not require cooling.

Shelf load must not exceed 3 kg per a meter of the distributed load.

Do not block the air conduits.

If the above requirements are not met, the air circulation is blocked, the performance of the product deteriorates, which may lead to the damage of food products.

The product compressor works in cycles turning off when the preset temperature is reached and turning on when it increases by 2-3°C.

Thus, air temperature in certain spots of the refrigerated enclosure may rise briefly and differ from controller readings, which does not constitute a defect.

During its operation, the compressor regularly stops for the evaporator to thaw. At the time of thawing, the temperature in the refrigerated enclosure may rise, which does not constitute a defect.

Rainy or humid weather may cause condensation in the display case. This is not a malfunction. In this case, wipe the display case with a soft cloth from time to time.

The main signs of refrigerated display normal operation are the following:

- the temperature in the internal enclosure matches the preset one;
- the refrigerating unit is operating in cycles.

3.5. TROUBLESHOOTING

If there is any malfunction, immediately disconnect the display case from the supply mains by pulling the power cord plug out of the socket and call for a mechanical engineer from the specialized service company authorized by the equipment supplier (vendor).

For troubleshooting, refer to Table 3.

WARNING! All work must only be performed after disconnecting the display case from the power supply net by pulling the power cord plug from the socket.

Table 3. List of potential malfunctions and their repair

Malfunction, symptoms and additional signs	Probable reason	Repair
1. Refrigerated display does not work, no network key-operated switch indication.	No power supply to the key-operated switch terminals.	Check power cord condition and repair, if necessary. Check voltage in the supply mains.
2. Refrigerated display is operating continuously or for a long time.	Warm products loading.	Avoid loading with hot and warm products. Decrease product loading frequency.
3. The preset temperature is not maintained in display case internal enclosure.	Evaporator is covered with thick ice layer.	Defreeze the evaporator by disconnecting the display case from the supply mains and having removed the products beforehand.
	Very high ambient temperature.	Display case shall be operated at ambient temperature of not more than +25°C.
	Air circulating is blocked because of the condenser soiling.	Check air access into the fans. Clean the condenser.

3.6. STORAGE REGULATIONS

The product must be stored packed in the room or under shelter at air temperature not lower than minus 35°C.

Guaranteed storage period is up to 6 months.

3.7. TRANSPORTATION

The packed device may be transported by any kind of transport except for the air transport. When transporting, provide the protection against mechanical damage. Avoid making sudden jerks and stops.

Placement and fixing of the packed box in transport must provide its stable positioning and exclude the possibility of displacement during transportation.

DO NOT TURN OVER THE BOXES!

HANDLE ONLY UPRIGHT!

3.8. GUIDELINES ON REMOVAL AND DISPOSAL OF WASTE AND ENVIRONMENTAL PROTECTION

The local environmental protection regulations shall be taken into consideration and complied with. Avoid ingress of water polluting substances into water bodies, soil, or sewage system.

Please promptly resolve the problem of waste collection and disposal without any damage to the environment (ground water and soil). The waste must be disposed of in accordance with existing local waste recycling regulations.

When preparing and shipping the device for disposal, display case components must be disassembled and sorted by material they are made from.

4. MAINTENANCE

4.1. GENERAL INSTRUCTIONS

The equipment must have two types of maintenance: daily in the course of operation and regular maintenance performed by the specialized company authorized by the equipment supplier (vendor).

Daily maintenance of equipment includes the monitoring of:

- internal enclosure temperature;
- condensate discharge system (water absence inside the product).

During the operation, the equipment must be kept clean. When cleaning, avoid the use of abrasive and corroding detergents.

WARNING! Before cleaning, turn the product off by pulling the power cord plug from the socket and remove the food from the internal enclosure!

Regular maintenance is performed according to the annual schedule made by the center which provides technical service before the planned year begins.

Regular maintenance includes a range of operations performed at least once every three months regardless of the device technical state at the beginning of maintenance.

List of work types for the regular maintenance:

- check if the device is placed and installed properly;
- clean the assemblies from contaminations, clean the condenser (if required);
- check if the components and assemblies are properly secured, re-tighten the fasteners;
- brazed piping joints leak test;
- check the reliability of electrical connections, re-tighten contacts on screwed connections;
- test mains voltage, check the earthing availability and status, wires and power cable isolation integrity;
- check display case earth circuit integrity - the resistance between power cord plug earth terminal and any accessible display case metal part shall not exceed 0.1 Ohm;
- check the internal enclosure cooling;
- check the refrigeration system cyclic operation, condenser blower speed, absence of frost deposit on the evaporator;
- check the controller program and readjust the parameters (if required).

Failure to perform scheduled maintenance will cancel the warranty obligations!

Please contact the authorized companies (Supplier or Vendor) or their service centers regarding any questions arising during the devices' start-up, operation, and maintenance.

Appendix A.
(Form)

CERTIFICATE OF PUTTING INTO OPERATION

This Certificate is made on _____ 20

by the owner of the refrigerated display _____
(organization name and address,

position, full name)
and the representative of the specialized technical service center

(name)

(position, full name)

that the refrigerated display of brand _____ serial number _____
with compressor _____,
manufactured on _____ 20

was put into operation on _____ 20 by electrical engineer

(company name,

full name of the engineer)
license to install and maintain commercial refrigerating
equipment No. _____ issued on _____

(company name)
The display case accepted for service by engineer

(company name,

full name of the engineer)
license to install and maintain commercial refrigerating
equipment No. _____ issued on _____

(company name)

Owner (signature) Full name

Representative of the Service Center (signature) Full name

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Appendix B.
(Form)

City (place) of device acceptance _____
Name of the device recipient (organization, enterprise) _____

Recipient's address and shipping details _____
_____ 20__

TECHNICAL EVALUATION REPORT

This report is made by _____
(recipient's representative, surname, position)
with the involvement of representatives _____
(surname and position of the manufacturer's representative)

_____ or the representative of the interested organization, date and number of the document authorizing the representatives to participate in the evaluation)
(Telegram inviting the manufacturer's representative is sent under No ___ dated ___ 20__)

that in the course of evaluation of the device _____
(name of device)

manufactured by _____
(manufacturer's name and address)

serial number of the device _____ the following was discovered:

1. Device storage conditions at the recipient's warehouse:

_____ (specify the conditions of device storage)

2. Containers and packaging condition

_____ (specify the outer labeling condition, date when the container was opened, quantity of missing components, their price, container and packaging defects)

3. The device is installed

_____ (specify in what conditions the device is installed)

4. Device installation

_____ (specify who installed the device and when, workmanship quality)

5. Condition of the device and its scope of delivery

_____ (specify the technical condition of the device, electrical equipment, their protection status etc., serial numbers, and manufacturing date)

6. List of deviations (defects):

7. To restore the device, it is necessary:

The report is made on ___ 20__

Signatures:

(The Report must be signed by all the persons who participated in the quality and completeness inspection)

Seal

Appendix C.

PYEZ1R05J4 (Carel) controller programming parameters						
Code	Description	Type	Min	Max	Fact	Unit of meas.
PS	Password	F	0	99	22	
-C1	Calibration of probe 1	F	-20	20	0.0	°C
St	Temperature set point	F	-50	90	2 (-5)*	°C
rd	Controller differential	F	0	19	4	°C
c0	Compressor start delay	C	0	99	0	Min
c2	Min. compressor OFF time	C	0	99	3	Min
dl	Interval between defrosts	C	0	24	6	hour
dP	Maximum defrost duration	C	1	99	15	Min
dd	Dripping time	C	0	15	0	Min
A0	Alarm and fan differential	C	-20	20	2.0	°C
AL	Low temperature alarm	C	-50	90	0	°C
AH	High temperature alarm	C	-50	90	0	°C
Ad	Low and high temperature alarm delay	C	0	99	0	Min
r1	Minimum set point	C	-50	r2	-5	°C
r2	Maximum set point	C	r1	90	10	°C

*The value in brackets is for **AC87 SV**