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ПРОМЫШЛЕННЫЕ ПРИВОДЫ

Техническое описание на

блоки жидкостного

охлаждения

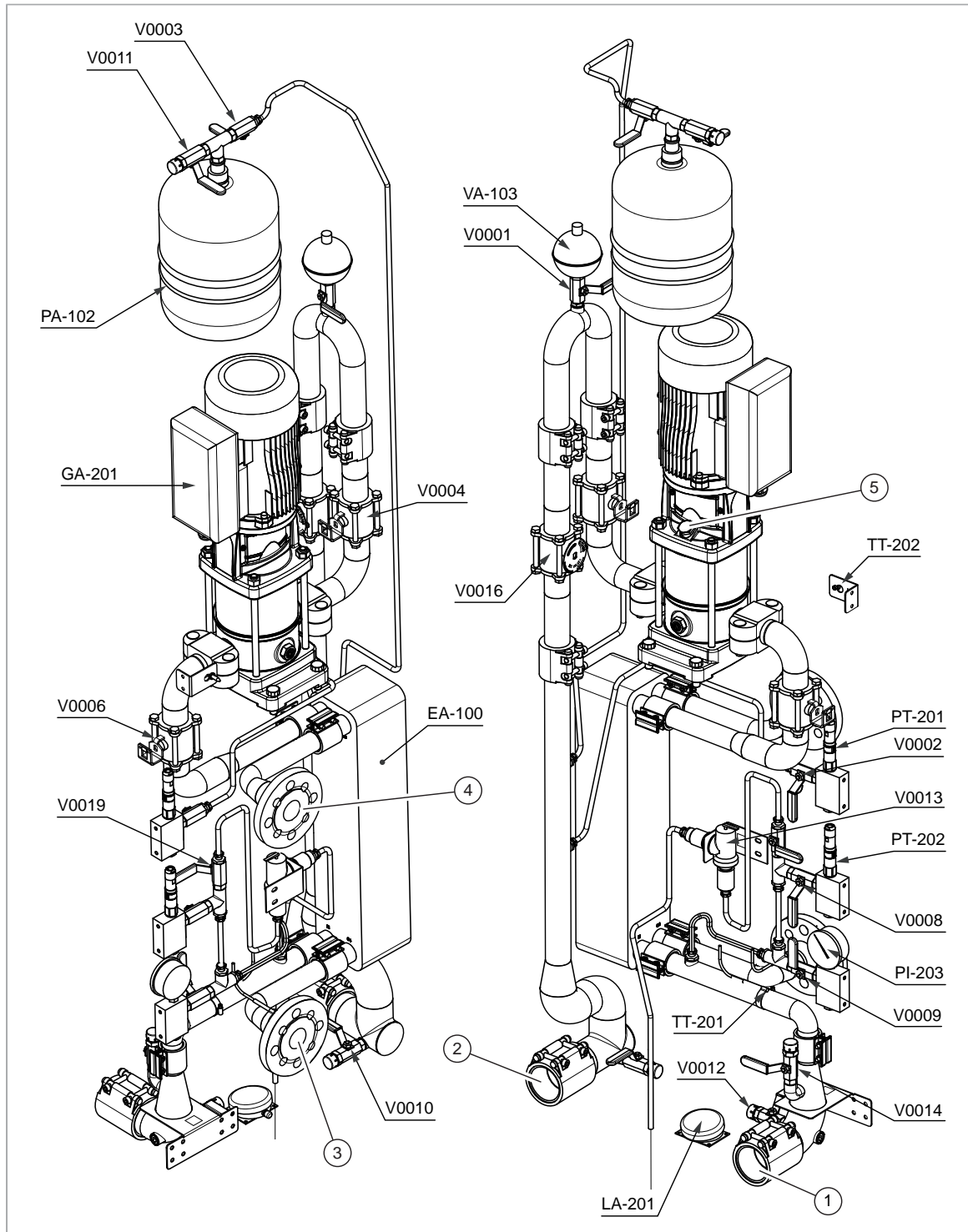
ACS800-1007LC



Layout drawings

■ Layout drawing – ACS880-1007LC-0070 in cabinet line-up

The illustration that follows shows the interior of the cooling unit. In this example, the cooling unit is attached to the right end of the drive cabinet line-up, and the user connects the external cooling circuit to the right side of the unit.



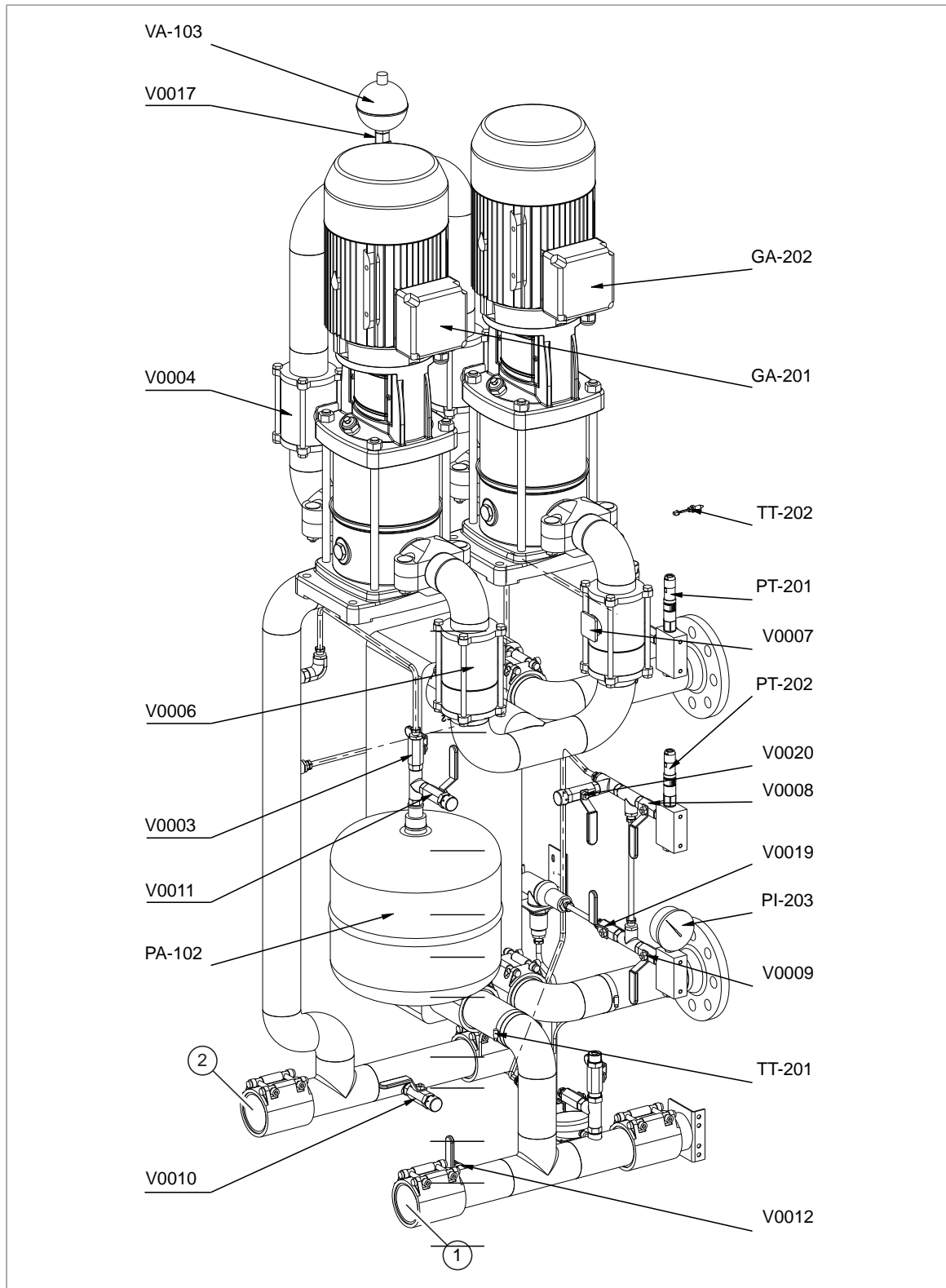
ACS880-1007LC-0070 component designations

The table below lists the component designations used in layout drawings, piping and instrumentation (PI) diagrams, and circuit diagrams.

Layout drawing	PI diagram	Circuit diagram	Description
1	-	-	Outlet to internal cooling circuit
2	-	-	Inlet from internal cooling circuit
3	-	-	Inlet from external cooling circuit
4	-	-	Outlet to external cooling circuit
5	-	-	Pump de-airing screw
GA-201	GA-201	-M201	Coolant pump 1
EA-100	EA-100	-	Heat exchanger
PA-102	PA-102	-	Expansion vessel
VA-103	VA-103	-	Automatic float air vent
PT-201	PT-201	-T201	Inlet pressure transmitter with low limit alarm
PT-202	PT-202	-T202	Outlet pressure transmitter
PI-203	PI-203	-	Coolant pressure gauge
-	TIA(C)-210	-	Coolant temperature indicator and alarm (and control with option +C242). This device is the LCU control unit.
TT-201	TT-201	-B201	Coolant temperature transmitter
TT-202	TT-202	-B202	Ambient temperature transmitter
TT-210	TT-210	(-A210)	Cabinet temperature transmitter
TT-211	TT-211	-B211	Coolant temperature transmitter if 2-way valve is installed (option +C242)
V0001	V0001	-	Shut-off valve for automatic float air vent
V0002	V0002	-	Pressure transmitter (PT-201) shut-off valve
V0008	V0008	-	Pressure transmitter (PT-202) shut-off valve
V0009	V0009	-	Pressure gauge (PI-203) shut-off valve
V0003	V0003	-	Expansion vessel shut-off valve
V0004, V0006	V0004, V0006	-	Pump shut-off valves
V0010	V0010	-	Drain/fill valve (internal circuit LCU inlet)
V0011	V0011	-	Expansion vessel bleed valve
V0012	V0012	-	Drain valve (internal circuit LCU outlet)
V0014	V0014	-	Fill valve (internal circuit LCU outlet)
V0013	V0013	-	Safety relief valve for UL (option +C129)
V0016	V0016	-	Control valve
V0018	V0018	-	Control valve if 2-way valve is installed (option +C242)
V0019	V0019	-	Shut off valve for the Safety relief valve (with option +C129 only)
-	SA-104	-	Strainer (with option +C242 only)
LA-201	LA-201	S201	Leakage detector
-	LA-211	S211	Leakage detector

■ **Layout drawing – ACS880-1007LC-0195 in cabinet line-up**

The two illustrations that follow show the interior of the cooling unit. In this example, the cooling unit is attached to the right end of the drive cabinet line-up, and the user connects the external cooling circuit to the right side of the unit.



ACS880-1007LC-0195 component designations

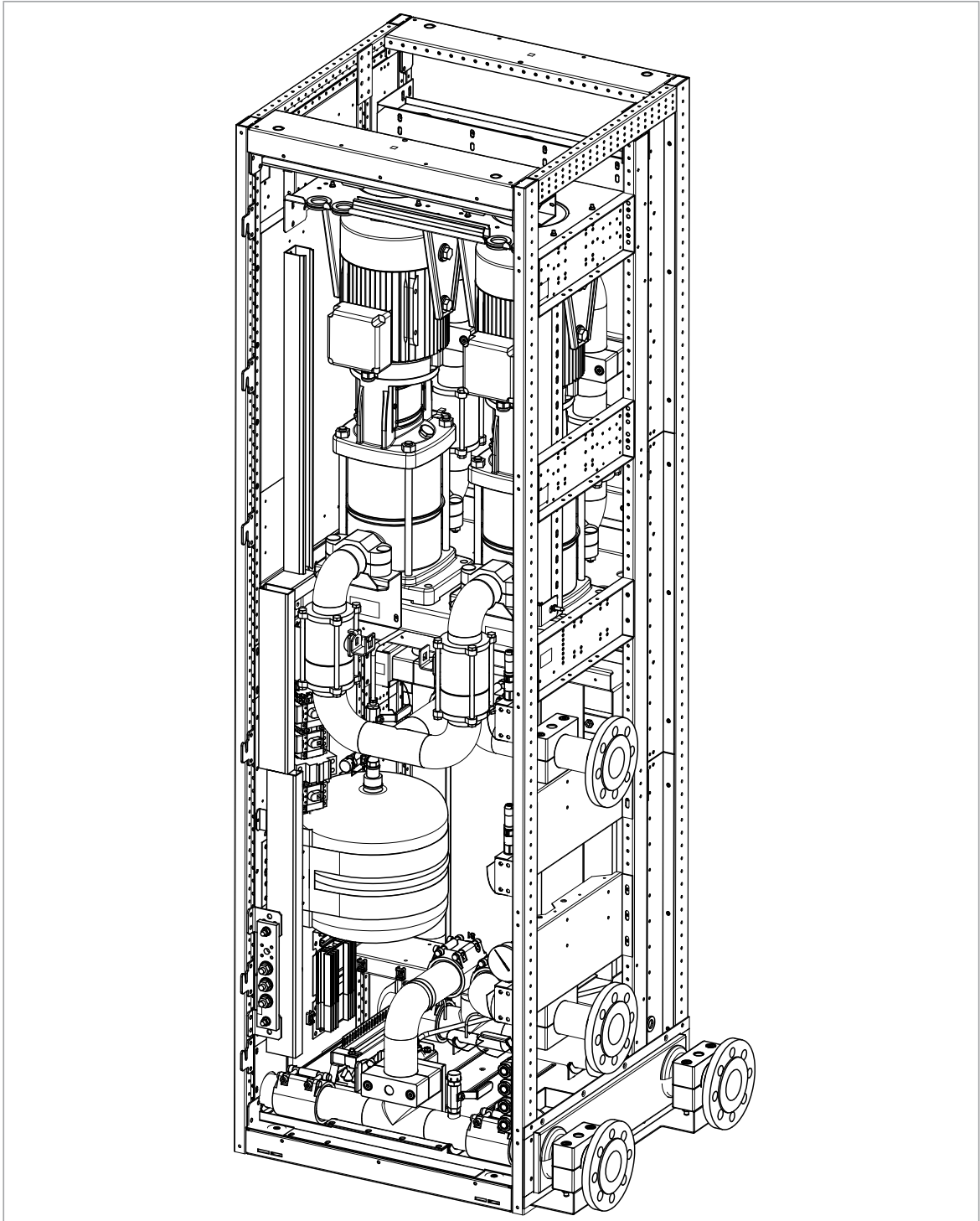
The table below lists the component designations used in layout drawings, piping and instrumentation (PI) diagrams, and circuit diagrams.

Layout drawing	PI diagram	Circuit diagram	Description
1	-	-	Outlet to internal cooling circuit
2	-	-	Inlet from internal cooling circuit
3	-	-	Inlet from external cooling circuit
4	-	-	Outlet to external cooling circuit
5	-	-	Pump de-airing screw
EA-100	EA-100	-	Heat exchanger
GA-201	GA-201	-M201	Coolant pump 1
GA-202	GA-202	-M202	Coolant pump 2
LA-201	LA-201	S201	Leakage detector
-	LA-211	S211	Leakage detector
PA-102	PA-102	-	Expansion vessel
PT-201	PT-201	-T201	Inlet pressure transmitter with low limit alarm
PT-202	PT-202	-T202	Outlet pressure transmitter
PI-203	PI-203	-	Coolant pressure gauge
-	TIA(C)-210	-	Coolant temperature indicator and alarm (and control with option +C242)
TT-201	TT-201	-B201	Coolant temperature transmitter
TT-202	TT-202	-B202	Ambient temperature transmitter
TT-210	TT-210	(-A210)	Cabinet temperature transmitter
TT-211	TT-211	-B211	Coolant temperature transmitter in 2-way control valve cubicle (with option +C242 only)
VA-103	VA-103	-	Automatic float air vent
V0001	V0001	-	Shut-off valve for automatic float air vent
V0002	V0002	-	Pressure transmitter (PT-201) shut-off valve
V0003	V0003	-	Expansion vessel shut-off valve
V0004 ... V0007	V0004 ... V0007	-	Pump shut-off/check valves
V0008	V0008	-	Pressure transmitter (PT-202) shut-off valve
V0009	V0009	-	Pressure gauge (PI-203) shut-off valve
V0010	V0010	-	Drain/fill valve (internal circuit LCU inlet)
V0011	V0011	-	Expansion vessel bleed valve
V0012	V0012	-	Drain/fill valve (internal circuit LCU outlet)
V0013	V0013	-	Safety relief valve for UL (option +C129)
V0014	V0014	-	Fill valve (internal circuit LCU outlet)
V0015	V0015	-	Shut off valve for extra LCU cubicle cooler (with option +C213 only)
V0016	V0016	-	Control valve
V0017	V0017	-	Shut off valve for extra LCU cubicle cooler (with option +C213 only)
V0018	V0018	-	Control valve (option +C242)
-	SA-104	-	Strainer (with option +C242 only)

Layout drawing	PI diagram	Circuit diagram	Description
V0019	V0019	-	Shut off valve for the safety relief valve (with option +C129 only)
V0020 ... V0021	V0020 ... V0021	-	Drain valves for ABB internal testing use in production

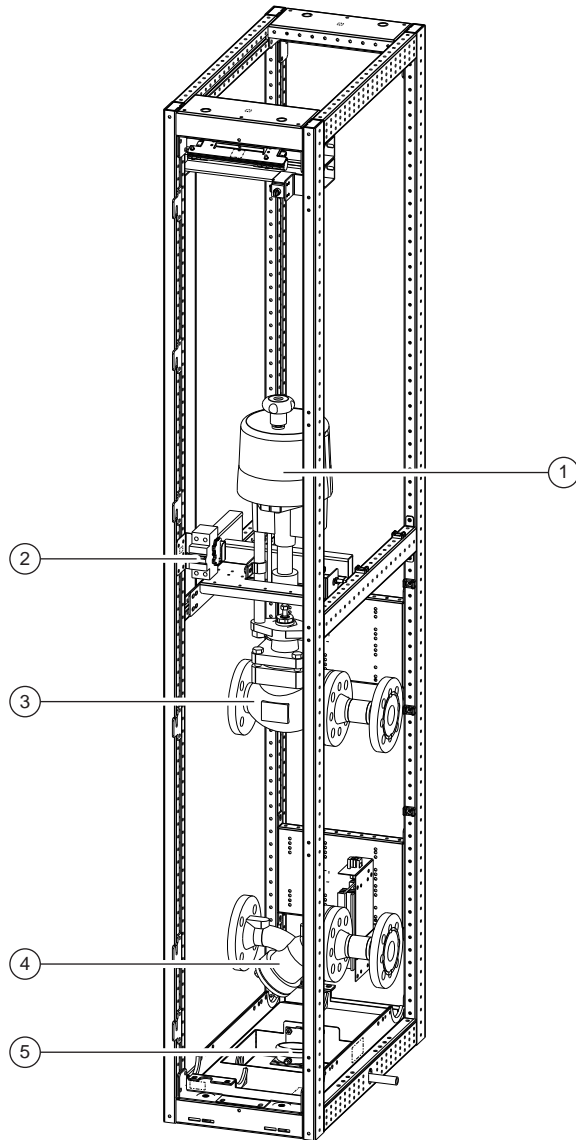
■ **Layout drawing – ACS880-1007LC-0195 stand-alone (option +C139)**

The illustration that follows shows a stand-alone cooling unit. In this example, the user connects the internal and external cooling circuits to the right side of the unit.



■ **Layout drawing – 2-way control valve cubicle (option +C242) for ACS880-1007LC-0070**

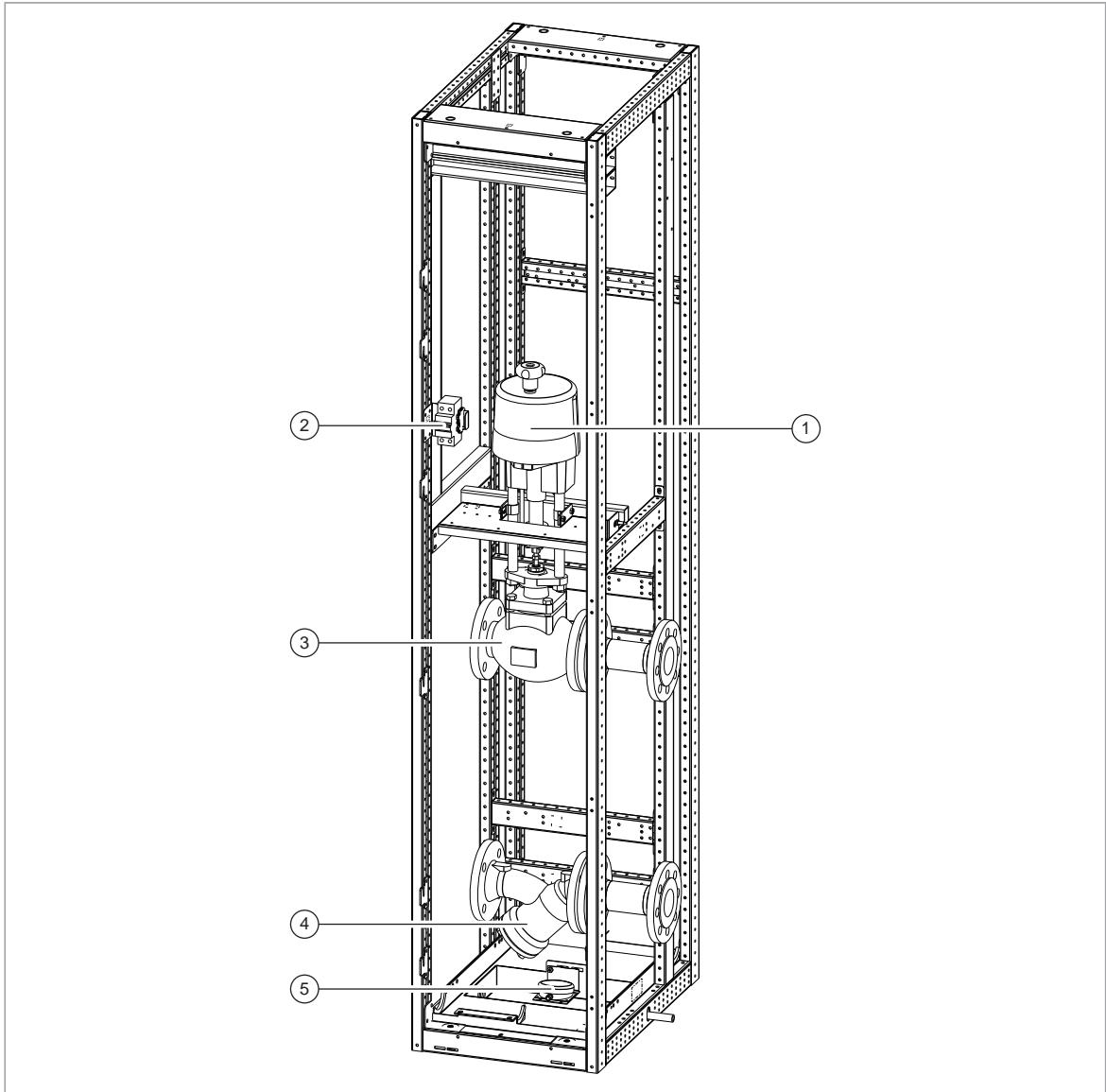
The illustration that follows shows the control valve cubicle for ACS880-1007LC-0070 in cabinet line-up. The cooling cubicle is on the left (not shown in the illustration), and the external cooling circuit connection is on the right.



1	Actuator for control valve
2	Circuit breaker for actuator
3	Control valve
4	Strainer
5	Leakage detector

■ **Layout drawing – 2-way control valve cubicle (option +C242) for ACS880-1007LC-0195**

The illustration that follows shows the control valve cubicle for ACS880-1007LC-0195 in cabinet line-up. The cooling unit cubicle is on the left (not shown in the illustration), and the external cooling circuit connection is on the right.



1	Actuator for control valve
2	Circuit breaker for actuator
3	Control valve
4	Strainer
5	Leakage detector

Technical data

Contents of this chapter

This chapter contains the technical specifications of the cooling unit.

Nominal cooling power, losses and pressure drop

ACS880-1007LC-...	P_{\max}		$P_{\text{loss total}}$		$P_{\text{loss coolant}}$		$P_{\text{loss air}}$	
	kW	hp	kW	hp	kW	hp	kW	hp
0070	70	94	0.4	0.5	0.3	0.4	0.1	0.1
0070+C242	70	94	0.4	0.5	0.3	0.4	0.1	0.1
0195+C140	195	261	1.3	1.7	1	1.3	0.3	0.4
0195+C141	195	261	1.3	1.7	1	1.3	0.3	0.4
0195+C213	195	261	2.1	2.8	1.8	2.4	0.3	0.4
0195+C242	195	261	2.1	2.8	1.8	2.4	0.3	0.4

Dimensions, weight and noise

Dimensions	See Dimension drawings (page 179).
Weight	ACS880-1007LC-0070: 200 kg (441 lbs) ACS880-1007LC-0070+C242: 280 kg (617 lbs) ACS880-1007LC-0195+C140: 310 kg (683 lbs) ACS880-1007LC-0195+C141: 366 kg (807 lbs) ACS880-1007LC-0195+C213: 373 kg (822 lbs) ACS880-1007LC-0195+C141+C242: 459 kg (1012 lbs)
Noise (Avg)	55 dB

Protection classes

Degree of protection (IEC/EN 60529)	IP42, IP54 (option +B055)
Overvoltage category (IEC 60664-1)	OVCII (with PD2)

Ambient conditions

Ambient temperature	0...55 °C (32...131 °F). No condensation or frost permitted.
Altitude	0...2000 m (0...6562 ft)

For more information, see the technical data of the drive.

Coolant flow and quantity

ACS880-1007LC-...	Internal flow ¹⁾		External flow ²⁾		Internal volume		External volume		External coolant pressure loss	
	l/min	US gal/min	l/min	US gal/min	l	US gal	l	US gal	kPa	Psi
0070	81/107	21/28	120	32	17	4.5	3	0.8	150	22
0070+C242	81/107	21/28	120	32	17	4.5	8	2.1	180	22
0195+C140	270/355	71/93	467	124	31	8.2	8	2.1	150	22
0195+C141	270/355	71/93	467	124	35	9.2	8	2.1	150	22
0195+C213	310/415	81/109	467	124	35	9.2	8	2.1	150	22
0195+C242	310/415	81/109	467	124	35	9.2	13	3.4	180	26

¹⁾ 120 kPa, Antifrogen® L 25%, 40 °C (104 °F), 50/60 Hz

²⁾ 36 °C (96.8 °F) water

Pump and pump motor

Unit type	ACS880-1007LC-0070	ACS880-1007LC-0195
Voltage code	+G434, +G436, +G437, +G454	+G434, +G436, +G437, +G454
Pump type	5SV04V0156T/D 2F	15SV02V0406T/D 2F
Motor type	SM90RB14/315	PLM112RB14S6/340 E3
Pump manufacturer	Lowara	Lowara
Motor power	1.5 kW	4 kW
Motor voltage and current (50 Hz)	Delta: 3~380 V ± 5%, 3.21 A / Star: 3~660 V ± 5%, 1.85 A Delta: 3~400 V ± 5%, 3.18 A / Star: 3~690 V ± 5%, 1.84 A	Delta: 3~380 V ± 5%, 7.80 A / Star: 3~660 V ± 5%, 4.50 A Delta: 3~400 V ± 5%, 7.62 A / Star: 3~690 V ± 5%, 4.40 A
Motor speed (50 Hz)	2885 rpm	2900 rpm
Motor voltage and current (60 Hz)	Delta: 3~380 V ± 5%, 3.05 A / Star: 3~660 V ± 5%, 1.76 A Delta: 3~400 V ± 5%, 2.80 A / Star: 3~690 V ± 5%, 1.61 A	Delta: 3~380 V ± 5%, 7.44 A / Star: 3~660 V ± 5%, 4.30 A Delta: 3~400 V ± 5%, 7.20 A / Star: 3~690 V ± 5%, 4.16 A

Unit type	ACS880-1007LC-0070	ACS880-1007LC-0195
Motor speed (60 Hz)	3505 rpm	3480 rpm

With external supply voltage 3~440 ... 480 V/60 Hz (option +G455):

Unit type	ACS880-1007LC-0070	ACS880-1007LC-0195
Voltage code	+G455	+G455
Pump type	5SV04V0156T/D	15SV02V0406T/D
Motor type	SM80.../315 E3	PLM100.../340 E3
Pump manufacturer	Lowara	Lowara
Motor power	1.5 kW	4 kW
Motor voltage and current (60 Hz)	Delta: 3~440 V ± 5%, 2.8 A Delta: 3~480 V ± 5%, 2.82 A	Star: 3~440 V ± 5%, 6.78 A Star: 3~480 V ± 5%, 6.71 A
Motor speed (60 Hz)	3490/3510 rpm	3515/3530 rpm

With external supply voltage 3~460 V/60 Hz (option +G456):

Unit type	ACS880-1007LC-0070	ACS880-1007LC-0195
Approval	+C129 (UL) or +C134 (CSA)	+C129 (UL) or +C134 (CSA)
Voltage code	+G456	+G456
Pump type	5SV04V0156T/D	15SV02V0406T/D
Motor type	M3AA 90LB 2	M3AA 112MB 2
Pump manufacturer	Lowara	Lowara
Motor manufacturer	ABB	ABB
Motor power	1.5 kW	4 kW
Motor voltage and current (60 Hz)	Star: 3~460 V ± 10%, 2.4 A	Star: 3~460 V ± 10%, 6.2 A
Motor speed (60 Hz)	3522 rpm	3500 rpm

With external supply voltage 3~575 V/60 Hz (option +G457):

Unit type	ACS880-1007LC-0070	ACS880-1007LC-0195
Approval	+C129 (UL) or +C134 (CSA)	+C129 (UL) or +C134 (CSA)
Voltage code	+G457	+G457
Pump type	5SV04V0156T/D	15SV02V0406T/D
Motor type	M3AA 90LB 2	M3AA 112MB 2
Pump manufacturer	Lowara	Lowara
Motor manufacturer	ABB	ABB
Motor power	1.5 kW	4 kW
Motor voltage and current (60 Hz)	Star: 3~575V ± 10%, 1.96 A	Star: 3~575V ± 10%, 5 A
Motor speed (60 Hz)	3522 rpm	3500 rpm

Pump motor power supply

The user must connect the power supply for the pump motor(s). The table that follows gives the specifications.

Power, voltage and current	Refer to Pump and pump motor (page 150).
Supply voltage tolerance	± 5% (±10% for UL/CSA)
Supply network	TN system or IT system
Frequency	50 or 60 Hz ± 5% (±2% for UL/CSA)
Imbalance	Maximum 3% of nominal phase-to-phase voltage
Network quality	Maximum permitted voltage THD < 5% Maximum voltage spikes < 1800 V Maximum dV/dt < 2500 V/us
Fuse size and type	IEC: max. fuse 25 A gG / 16 A aM at 50 kA supply network UL/CSA: max. fuse 30 A, J type fuse at 10 kA supply network
Recommended conductor size (Cu)	IEC: <u>ASC880-1007LC-0070:</u> 1.5 mm ² <u>ASC880-1007LC-0195:</u> 2.5 mm ² <u>ASC880-1007LC-0195+C213:</u> 6 mm ² UL/CSA: <u>ASC880-1007LC-0070:</u> 2.5 mm ² (14 AWG) <u>ASC880-1007LC-0195:</u> 2.5 mm ² (14 AWG) <u>ASC880-1007LC-0195+C213:</u> 6 mm ² (10 AWG)
Cable voltage rating	min. 600 V AC cable for up to 500 V AC, min. 750 V AC cable for up to 600 V AC, min. 1 kV AC cable for above 600 V AC supply
Terminal size and tightening torque	0.75 ... 10 mm ² (18...8 AWG), 0.8 N·m (7.1 lbf·in)
Protective earth (PE) connection	Fixed
Residual current device (RCD)	Not recommended

■ Requirements for pump power supply (Q200)

ASC880-1007LC-...	S_p	$I_{p,max}$	Term. min.	Term. max.	Torque
	VA	A	mm ² (AWG)	mm ² (AWG)	N·m (lbf·in)
0070	1500	3.21	0.75 (18)	10 (8)	0.8 (7.1)
0195	4000	7.8	0.75 (18)	10 (8)	0.8 (7.1)
0195+C213	8000	15.6	0.75 (18)	10 (8)	0.8 (7.1)

ASC880-1007LC-...	3~380 ... 480 V AC		3~660 ... 690 V AC	
	I_{cb}	$I_{sc,min}$	I_{cb}	$I_{sc,min}$
	A	A	A	A
0070	2.5 ... 4	54	1.6 ... 2.5	44
0195	6.3 ... 10	225	4 ... 6.3	56
0195+C213	2 × 6.3 ... 10	225	2 × 4 ... 6.3	56

With option codes +C129 (UL) or +C134 (CSA):

ASC880-1007LC-...	3~460 ... 480 V AC		3~575 ... 600 V AC	
	I_{cb}	$I_{sc,min}$	I_{cb}	$I_{sc,min}$
	A	A	A	A
0070	1.6 ... 2.5	44	1.6 ... 2.5	44
0195	4 ... 6.3	56	4 ... 6.3	56
0195+C213	2 × 4 ... 6.3	56	2 × 4 ... 6.3	56

S_p	Apparent power when the cooling unit is running
$I_{p,max}$	Maximum continuous load current when the cooling unit is running
Term. min.	Minimum conductor size accepted by the input terminal (supply disconnecting device Q200)
Term. max	Maximum conductor size accepted by the input terminal (supply disconnecting device Q200)
Torque	Terminal tightening torque
I_{cb}	Current range rating of the internal motor circuit breaker
$I_{sc,min}$	Minimum short-circuit current. The user-defined power supply and cable must be able to supply this fault current to the cooling unit connection point when there is a short-circuit fault. The cable short-circuit protection must also limit the duration of the fault to less than 5 seconds ($t < 5$ s).

The user must dimension the supply cable according to local and national requirements. Cable size depends on upstream fuse, cable length, cable type, assembly method and ambient temperature. The short-circuit current available at the input terminals must be equal to, or more than the minimum short-circuit current $I_{sc,min}$.

Auxiliary power supply for the control circuits

Cooling unit in drive cabinet line-up (option +C138): Connected to the drive auxiliary voltage supply at the factory. No user connections are necessary.

Stand-alone cooling unit (option +C139): The user must connect the power supply for the control circuits. The table that follows gives the specifications.

Power	<u>ACS880LC-1007-0070:</u> 138 VA <u>ACS880LC-1007-0195:</u> 150 VA
Voltage and frequency	1~230 or 115 V AC \pm 10%, 50 or 60 Hz \pm 5%
Supply network	TN system. For IT system, consult ABB.
Fuse size and type	IEC: max. fuse 10 A gG at 50 kA supply network UL/CSA: max. fuse 6 A, J type fuse at 10 kA supply network
Recommended conductor size (Cu)	IEC: 1.5 mm ² UL/CSA: 2.5 mm ² (14 AWG)
Terminal size and tightening torque	0.75 ... 10 mm ² (18...8 AWG), 0.8 N·m (7.1 lbf·in)
Protective earth (PE) connection	Fixed
Residual current device (RCD)	Not recommended

■ Requirements for control circuit power supply (Q210)

ASC880-1007-...	S_R	S_{SB}	Term. min.	Term. max.	Torque
	VA	VA	mm ² (AWG)	mm ² (AWG)	N·m (lbf·in)
0070	138	126	0.75 (18)	10 (8)	0.8 (7.1)
0195	150	126	0.75 (18)	10 (8)	0.8 (7.1)

ASC880-1007-...	~230 V AC		~115 V AC	
	I_{cb}	$I_{sc,min}$	I_{cb}	$I_{sc,min}$
	A	A	A	A
0070	4	40	4	40
0195	4	40	4	40

- S_R Apparent power when the cooling unit is running (with 75% load of the 24 V DC power source)
- S_{SB} Apparent power when the cooling unit is at stand-by (with 75% load of the 24 V DC power source)
- Term. min. Minimum conductor size accepted by the input terminal (supply disconnecting device Q210)
- Term. max. Maximum conductor size accepted by the input terminal (supply disconnecting device Q210)
- Torque Terminal tightening torque
- I_{cb} Current range rating of the internal miniature circuit breaker
- $I_{sc,min}$ Minimum short-circuit current. The user-defined power supply and cable must be able to supply this fault current to the cooling unit connection point when there is a short-circuit fault. The cable short-circuit protection must also limit the duration of the fault to less than 5 seconds ($t < 5$ s).

The user must dimension the supply cable according to local and national requirements. Cable size depends on upstream fuse, cable length, cable type, assembly method and ambient temperature. The short-circuit current available at the input terminals must be equal to, or more than the minimum short-circuit current $I_{sc,min}$.

Power supply for the cabinet heater (option +G300) and lighting (option +G301)

Cooling unit in drive cabinet line-up (option +C138): Connected to the drive auxiliary voltage supply at the factory. No user connections are necessary.

Stand-alone cooling unit (option +C139): The user must connect the power supply for the cabinet heater and lighting. The table that follows gives the specifications.

Power	90 VA
Voltage and frequency	1~230 or 115 V AC \pm 10%, 50 or 60 Hz \pm 5%
Supply network	TN system. For IT system, consult ABB.
Fuse size and type	IEC : max. fuse 25 A gG at 50 kA supply network UL/CSA : max. fuse 15 A, J type fuse at 10 kA supply network
Recommended conductor size (Cu)	IEC : 1.5 mm ² UL/CSA : 2.5 mm ² (14 AWG)
Terminal size and tightening torque	0.75 ... 10 mm ² (18...8 AWG), 0.8 N·m (7.1 lbf·in)

Protective earth (PE) connection	Fixed
Residual current device (RCD)	Not recommended

■ Requirements for heating and lighting power supply (Q295)

ASC880-1007-...	S	Term. min.	Term. max.	Torque
	VA	mm ² (AWG)	mm ² (AWG)	N·m (lbf·in)
0070...0195	90	0.75 (18)	10 (8)	0.8 (7.1)

ASC880-1007-...	~230 V AC		~115 V AC	
	I_{cb}	$I_{sc,min}$	I_{cb}	$I_{sc,min}$
	A	A	A	A
0070...0195	4	40	4	40

S Apparent power

Term. min. Minimum conductor size accepted by the input terminal (supply disconnecting device Q295)

Term. max. Maximum conductor size accepted by the input terminal (supply disconnecting device Q295)

Torque Terminal tightening torque

I_{cb} Current range rating of the internal miniature circuit breaker

$I_{sc,min}$ Minimum short-circuit current. The user-defined power supply and cable must be able to supply this fault current to the cooling unit connection point when there is a short-circuit fault. The cable short-circuit protection must also limit the duration of the fault to less than 5 seconds ($t < 5$ s).

The user must dimension the supply cable according to local and national requirements. Cable size depends on upstream fuse, cable length, cable type, assembly method and ambient temperature. The short-circuit current available at the input terminals must be equal to, or more than the minimum short-circuit current $I_{sc,min}$.

Filling pump

Example pumps:

- Rothenberger RP50 or TP25 Testing pump. See rothenberger.com.

Make sure that the hose and fitting are the correct type for the cooling unit connection.

Materials

■ Liquid cooling unit

Refer to [Recycling instructions and environmental information for ACS880 cabinet-installed drives and multidrives modules \(3AXD50000153909 \[English\]\)](#).

■ Package materials for liquid cooling unit

- Plywood¹⁾
- Wood
- PET (strapping)
- PE (VCI foil)
- Metal (fixing clamps, screws)
- VCI emitter capsules
- Clay desiccant.

¹⁾ Seaworthy package only

■ Package materials for options

- Cardboard
- Kraft paper
- PP (straps)
- PE (foil, bubble wrap)
- Plywood, wood (only for heavy components).

Materials vary according to the item type, size and shape. Typical package consists of a cardboard box with paper filling or bubble wrap. ESD-safe packing materials are used for printed circuit boards and similar items.

■ Manuals

Printed product manuals are recyclable paper. Product manuals are available on the Internet.

Disposal

The main parts of the drive can be recycled to preserve natural resources and energy. Product parts and materials should be dismantled and separated.

Generally all metals, such as steel, aluminum, copper and its alloys, and precious metals can be recycled as material. Plastics, rubber, cardboard and other packaging material can be used in energy recovery. Printed circuit boards and large electrolytic capacitors need selective treatment according to IEC 62635 guidelines. To aid recycling, plastic parts are marked with an appropriate identification code.

Contact your local ABB distributor for further information on environmental aspects and recycling instructions for professional recyclers. End of life treatment must follow international and local regulations. See [ACS880 cabinet-installed drives and multidrives modules recycling instructions and environmental information \(3AXD50000153909 \[English\]\)](#).

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