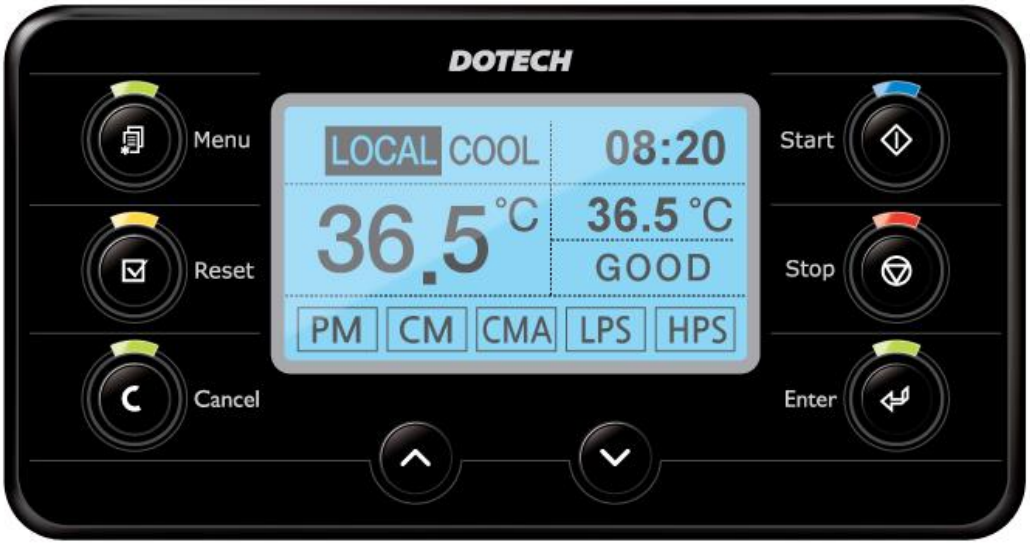
Universal Intelligent Controller

CX9230 Series
Smart Chiller Controller



DOTECH
SENSING & CONTROL

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Homepage: www.dotech21.com | E-mail: business@dotech21.com

※ Precautions for use

1. This Product May cause an Electric Shock in handling, please do not attempt to open it with power turned on.
2. This Product should be installed in a place fixed securely by a rack or panel.
3. This Product can be used under the following environmental conditions.
① Indoor ②Pollution Degree 2 ③At an Altitude of 2000m or below ④Installation Category Ⅱ
4. To turn on or turn off power supply for this product, please the Circuit Breaker or Switch of a standard product of IEC 60947-1 or IEC 60947-3 product and install it within a close distance allowing convenient operation by user.
5. Please be understood that if this product is dismantled or modified discretionary after sales service will not be able to be provided.
7. In order to prevent it from an noise, please maintain the high-voltage wire and power wire separated.
8. Please avoid installing the product in a place where a strong magnetism, noise, severe vibration and
impact exist.
9. When extending the sense wire, use a shield wire and do not extend it unnecessarily long.
6. An Output Wire to be used for this product should be Inflammable Grade FV1(V-1 grade or above), the thickness of the wire should be AWG No.20 or above.(0.50mm **2**)
10. The sensor wire and signal wire should be away from the power and load wires using conduits separately installed.
11. Please avoid using the product near a device generating strong high frequency noise(High-frequency
welding machine, High-frequency sewing machine, high-frequency radiotelegraph, High capacity SCR Controller).
12. Product's damages other than those described in the guarantee conditions provided by the manufacturer shall not be responsible by us

※ The aforementioned precautions must be observed, and if you fail to do so, it may cause a product's breakdown.

DOTECH SENSING & CONTROL	CX9230 Recipro/Scroll(Chiller) Controller	REV DATE R20180403
	USERS MANUAL	

1.Summary

1.1 Features

Controller has a precise PID control algorithm, Built in auto tuning function, Possible to connect low/high pressure sensor. Dual sensor input processing, Built in analog output function, Language support for both Korean and English), Built in trip/alarm data log

1.2 Applications

Air (Water) cooled chiller, Cold and hot water chiller, Mold temperature controller, Oil chiller and etc.

1.3 Product components

CX9230 BODY

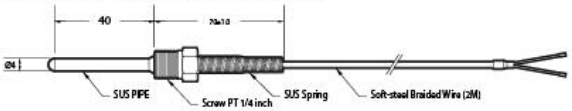
Waterproofing casket

Fixing bracket 2ea

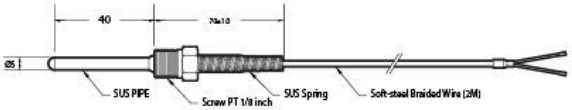
Connector 10ea

Temperature sensor

DPR-TH01-S4D40L*1/4*2M (NTC5Kohm,1%)



DPR-TH01-S5D40L*1/8*2M (NTC5Kohm,1%)



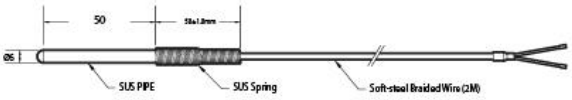
Pressure sensor

DP514-P050 (0~50bar)

DP514-P115 (-1~15bar)

Discharge gas temp. sensor

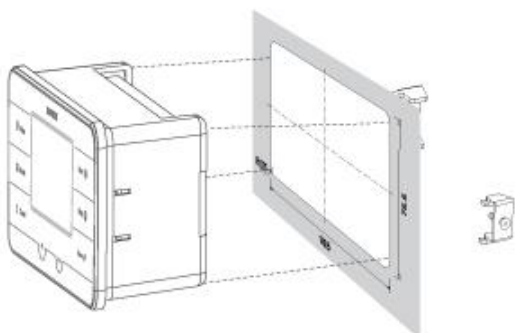
DPR-TH02-P6D50L*2M (NTC 10Kohm, 1%)

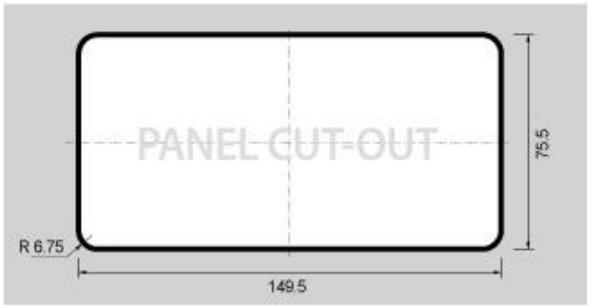


Power transformer

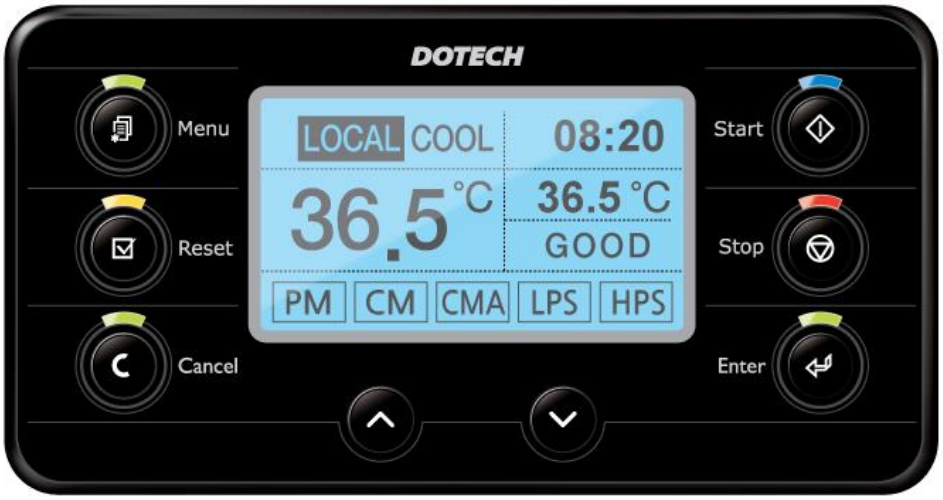
24069001

1.4 Installation



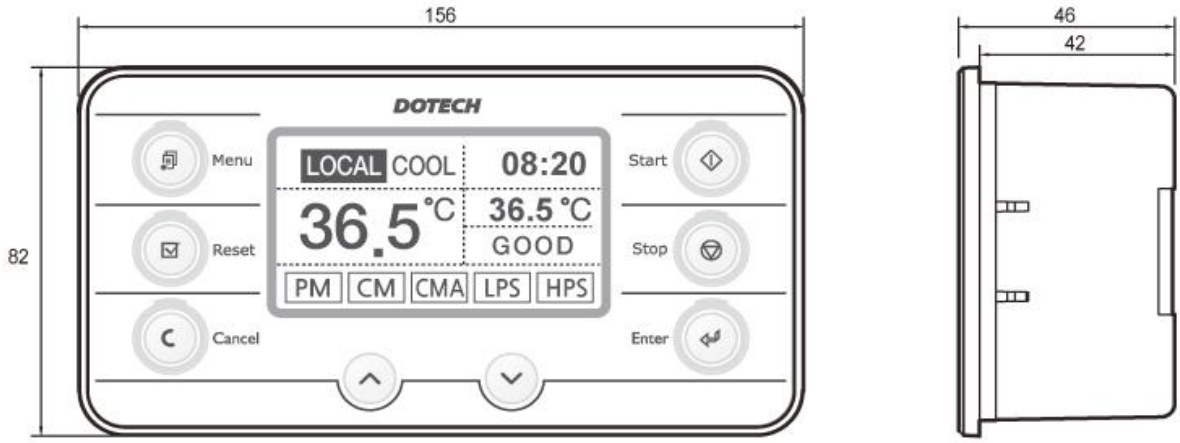


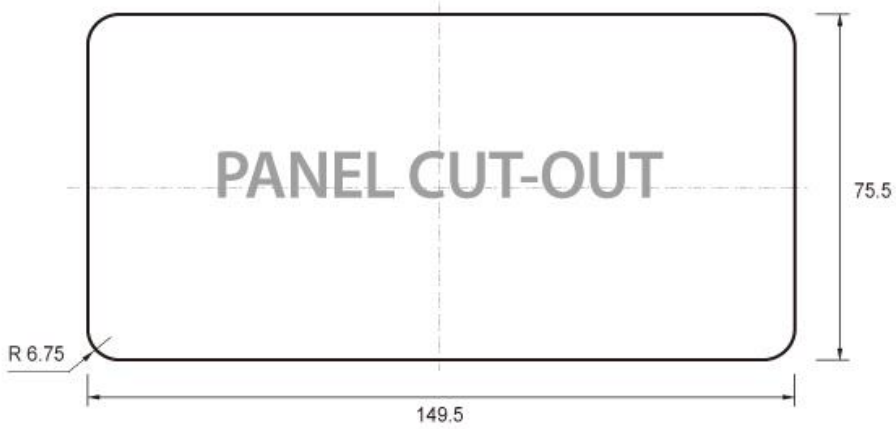
1.5 Ordering Guide



CX9230 series		CX9230-L1	CX9230-L	CX9230-M	CX9230-V
Power		24Vac, 50/60Hz			
Power Consumption		Max. 600mA@ 24Vac			
Digital	Input	Opto-Isolation 8P (1P Common)			
	Output	Relay output 4P		Relay output 8P	
Analog	Input	Temp. sensor 2P, 4~20mA 2P			
	Output	-	-	-	4~20mA 2P
RTC (Real Time Clock)		-	O	O	O
PID Control Logic		-	-	O	O
Communication		-	-	-	MODBUS RTU / RS485
Connection		Screw Terminal			
LCD		WIDE LCD (128x64) / TACT BUTTON TYPE			
Operation Temp.		Temp. -10~50℃ Humidity under 90%RH			
Storage Temp.		Temp. -20~60℃ Humidity under 90%RH			

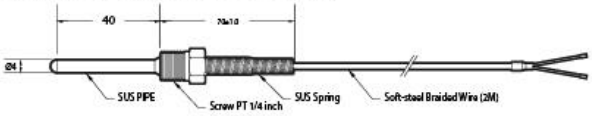
1.6 Dimension



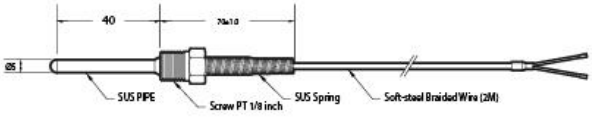


Temperature sensor

DPR-TH01-S4D40L*1/4*2M (NTC5Kohm,1%)



DPR-TH01-S5D40L*1/8*2M (NTC5Kohm,1%)



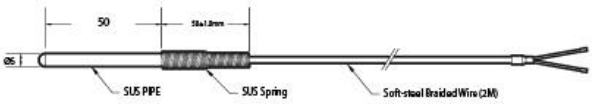
Pressure sensor

DP514-P050 (0~50bar)

DP514-P115 (-1~15bar)

Discharge gas temp. sensor

DPR-TH02-P6D50L*2M (NTC 10Kohm, 1%)

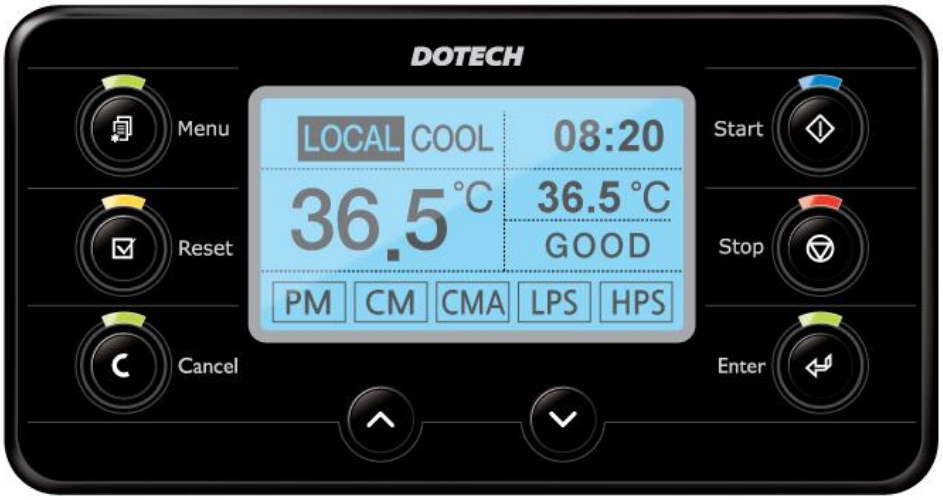


Power transformer

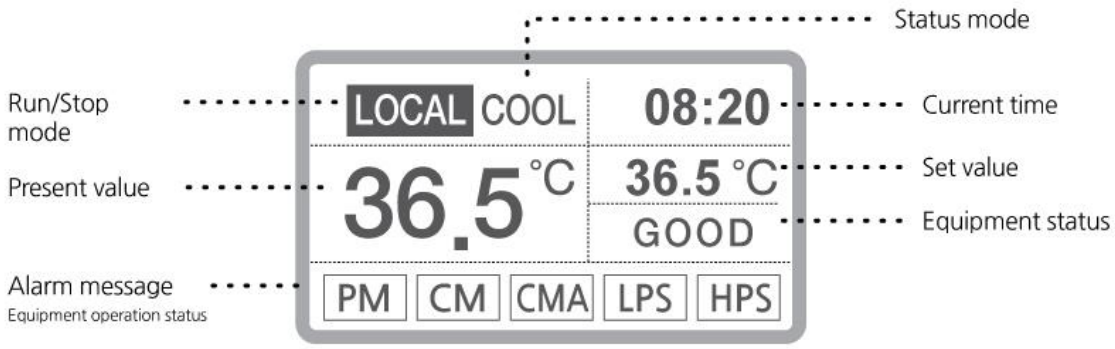
24069001

2. Operation and Display part

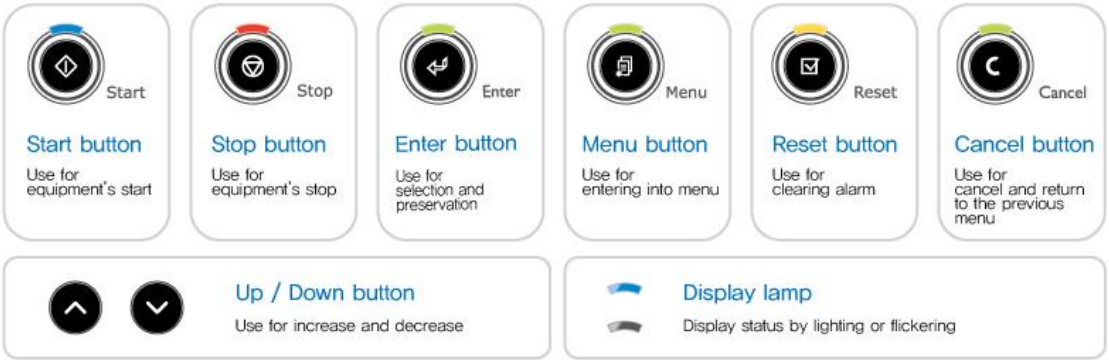
2.1 Front layout



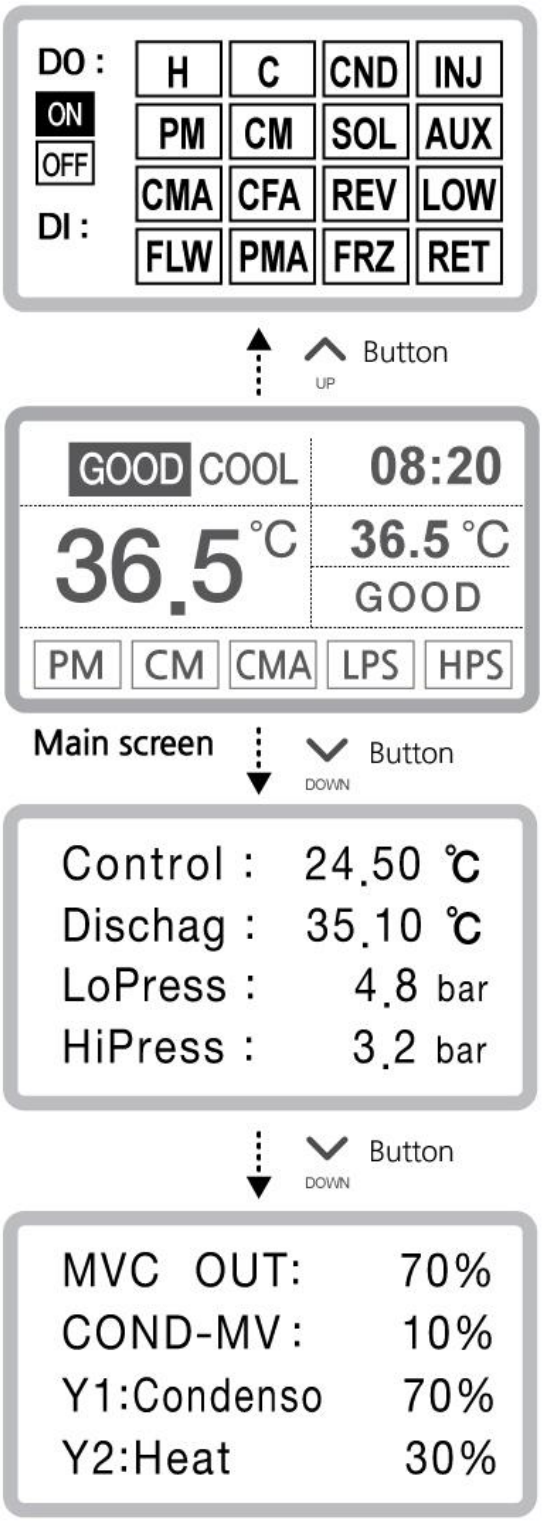
2.2 Screen composition



2.3 Operation button and display lamp



2.4 Status check of input and output



Status of digital output signal

UP Press ^ key at status of main screen

Adjustment of LCD contrast

Cancel + UP Increase of LCD contrast

Cancel + DOWN Decrease of LCD contrast

Status of present temperature

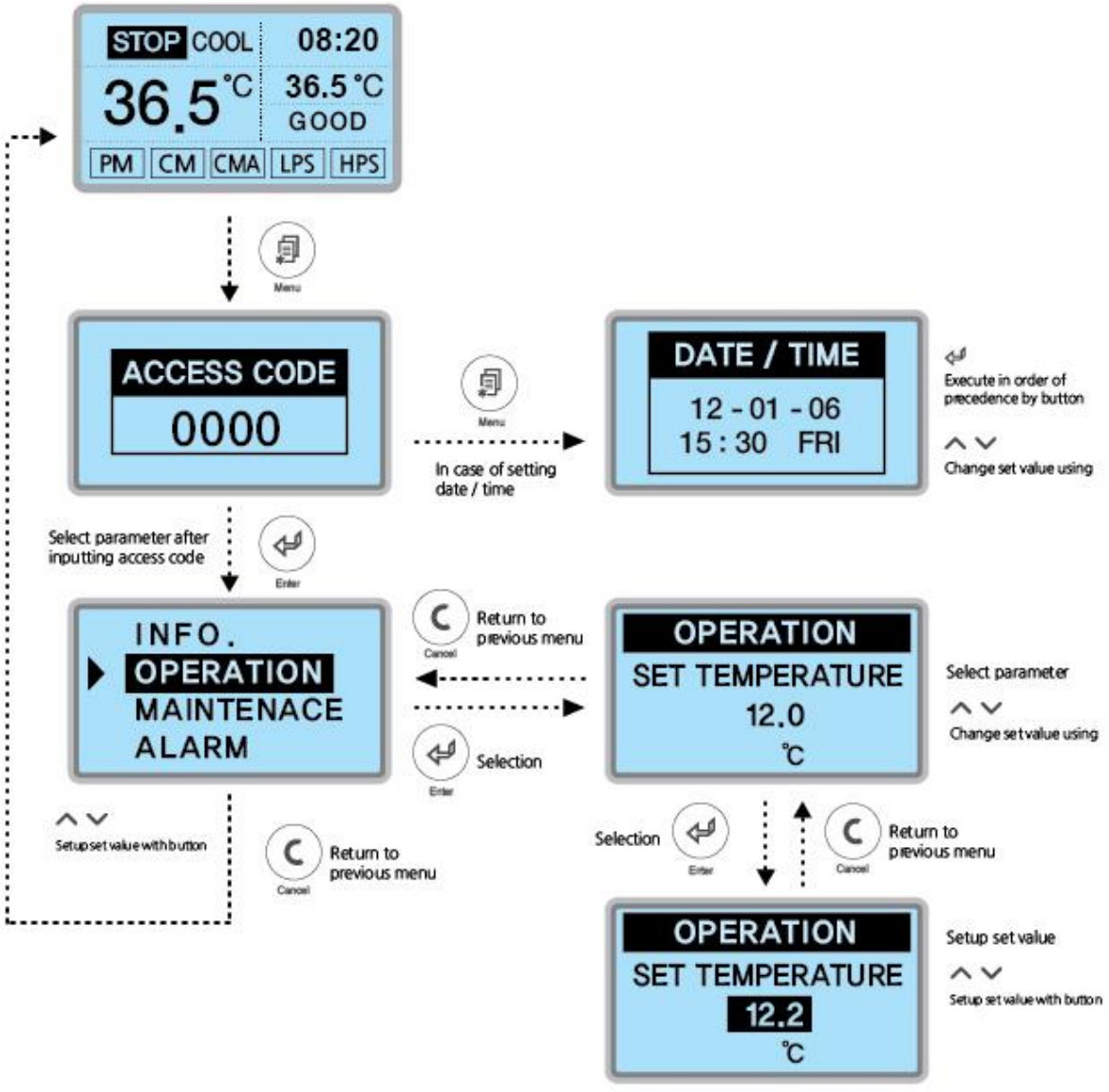
DOWN Press v key at status of main screen

Status of present temperature

DOWN Press v key at status of main screen

2.5 Parameter change

If pressing menu button, screen of access code input will be displayed.
Access code is classified into 0000(FREE), 0009(USER), 0100(SERVICE) and 0119(MASTER).
Press enter button for next steps process after input access code using up/down button
Users can view and access of parameters within the scope of authority according to access code. And also, users can change SERVICE code and MASTER CODE at CONFIG menu.



3.TRIP MESSAGE

3.1 TRIP MESSAGE

No.	Alarm	Remarks
1	SYSTEM FAULT	Please request a warranty to DOTECH INC.
2	CTRL.T SENSOR	In case of occurrence of error on CTRL.T SENSOR(B1) (Disconnection / Short)
3	AUX.T SENSOR	In case of occurrence of error on AUX.T SENSOR(B2) (Disconnection / Short)
4	DSCHG.T SENSOR	In case of occurrence of error on DSCHG.T SENSOR(B2) (Disconnection / Short)
5	LP-PRESS. SENSOR	In case of occurrence of error on LP-PRESS.SENSOR(B4) (Disconnection / Short)
6	HP-PRESS. SENSOR	In case of occurrence of error on HP-PRESS.SENSOR(B5) (Disconnection / Short)
7	COMPRESSOR ALARM	In case of occurrence of alarm on ID1
8	CONDENSOR FAN	In case of occurrence of alarm on ID2
9	REVERSE PHASE	In case of occurrence of alarm on ID3
10	LOW LEVEL	In case of occurrence of alarm on ID4
11	NO FLOW DETECT	In case of occurrence of alarm on ID5
12	PUMP ALARM	In case of occurrence of alarm on ID6
13	LO-PRESS	In case of occurrence of error on LO-PRESS(B4) (Disconnection / Short)
14	HI-PRESS	In case of occurrence of error on HI-PRESS(B5) (Disconnection / Short)
15	FREEZE OFF	In case of occurrence of alarm on ID7
16	LO-TEMP ALARM	B1 Temp. < [ALARM: LO-TEMP ALARM]
17	HI-TEMP ALARM	B1 Temp. > [ALARM: HI-TEMP ALARM]
18	DSCHG LO-TEMP	B2 Temp. < [TRIP: DSCHG LO-TEMP]
19	DSCHG HI-TEMP	B2 Temp. > [TRIP: DSCHG HI-TEMP]
20	LP-PRESS. HI	B4 Press. > [ALARM: LP-PRESS. HI]
21	HP-PRESS.LO	B5 Press. < [ALARM: HP-PRESS.LO]
22	SENSOR CHECK	In case of exceeding of time on [MAINTENANCE: SENSOR CHECK]
23	SAFETY PARTS	In case of exceeding of time on [MAINTENANCE: SAFETY PARTS]
24	ELECTRIC PARTS	In case of exceeding of time on [MAINTENANCE: ELECTRIC PARTS]
25	COMPRESSOR PARTS	In case of exceeding of time on [MAINTENANC: COMPRESSOR PARTS]
26	REFERIGERANT	In case of exceeding of time on [MAINTENANCE: REFERIGERANT]
27	OVERHAUL	In case of exceeding of time on [MAINTENANCE: OVERHAUL]

3.2 STATUS MESSAGE

No.	Alarm	Remarks
1	FIRST POWER ON	Initial Power Input
2	POWER ON	Power Supply
3	PARAMETER CHANGE	In case of changed a setting value
4	MACHINE START	Machine Start
5	MACHINE STOP	Machine Stop

4.Parameter

4.1 INFO

NO	Parameter	Default	Min.	Max.	View	Access	Description
4 0001	TOTAL RUN HOUR	0 Hour	0	32000	FREE	MASTER	Total run hour of unit will be recorded.
4 0002	COMP. RUN HOUR	0 Hour	0	32000	FREE	MASTER	Run hour of compressor will be recorded.
4 0003	COMP. RUN TIMES	0 Times	0	32000	FREE	MASTER	Run times of compressor will be recorded.
4 0006	PV DISPLAY MODE	0	0	17	FREE	MASTER	0=PV 1=B1 2=B2 3=LP 4=HP 5=PV+B1 6=PV+B2 7=B1+B2 8=B2+B1 9=PV+LP 10=PV+HP 11=LP+HP 12=HP+LP 13=PV+MVC 14=PV+MV 15=PV+Y1 16=PV+Y2 17=PV+COND
4 0007	CLOCK DISPLAY	0	0	10	FREE	MASTER	0=CLOCK 1=MVC 2=MV 3=Y1 4=Y2 5=CONDEN MV 6=CLOCK+MVC 7=CLOCK+MV 8=CLOCK+Y1 9=CLOCK+Y2 10=CLOCK+CND

4.2 OPERATION

NO	Parameter	Default	Min.	Max.	View	Access	Description
4 0021	SET TEMPERATURE	12.0℃	-50.0	99.9	FREE	USER	Apply in case of {Function →Control mode }=0:Temperature
4 0022	SET PRESSURE	2.5bar	-1.0	99.9	FREE	USER	Apply in case of Function →Control mode }=1: LPress
4 0023	RUN DIFFERENCE	+2.0K	-99.9	+99.9	FREE	SERVICE	RUN DIFFERENCE should be higher than STOP DIFFERENCE.≥ {Set value} + {RUN DIFFERENCE} :ON
4 0024	STOP DIFFERENCE	-1.0K	-99.9	+99.9	FREE	SERVICE	STOP DIFFERENCE should be lower than RUN DIFFERENCE. ≤ {Set value} + {STOP DIFFERENCE} :OFF
4 0025	N1:HEAT-ON	-1.0K	-99.9	+99.9	SERVICE	SERVICE	In case of setting HEAT(Hys), Hot-gas(Hys) in {IN/OUT→N1:HEAT} ≤{Set value} + {N1:HEAT-ON} : ON ≥{Set value} + {N2:HEAT-OFF} :OFF
4 0026	N1:HEAT-OFF	0.0K	-99.9	+99.9	SERVICE	SERVICE	
4 0027	N2:COOL-ON	+1.0K	-99.9	+99.9	SERVICE	SERVICE	In case of setting COOL(Hys), Coolgas(Hys) in{IN/OUT→N2:COOL} ≥{Set value} + {N2:COOL-ON} :ON ≤{Set value} + {N2:COOL-OFF} : OFF
4 0028	N2:COOL-OFF	0.0K	-99.9	+99.9	SERVICE	SERVICE	
4 0029	N3:COND.CONTROL	24.0bar	-1.0	99.9	SERVICE	SERVICE	It will be displayed in case of using high pressure sensor High pressure≥ { N3:COND.CONTROL} :ON High pressure≤ { N3:COND. STOP DIF} :OFF
4 0030	N3:COND.STOP DIF	-3.0K	-99.9	-0.1	SERVICE	SERVICE	Working condition for high pressure sensor
4 0031	N4:LINJ.CONTROL	95℃	0	150	SERVICE	SERVICE	Only operate when comp. is running ≥N4:LINJ.CONTROL, N4:LINJ :O≤N4:LINJ.CONTROL + N4:LINJ.STOP DIF,N4:LINJ : OFF
4 0032	N4:LINJ.STOP DIF	-10K	-99	-1	SERVICE	SERVICE	
4 0034	Y1 MANUAL OUTPUT	0%	0	100	FREE	SERVICE	Unuse: Y1 automatic mode , 0~100%: Y1 Output by manual operation
4 0035	Y2 MANUAL OUTPUT	0%	0	100	FREE	SERVICE	Unuse: Y2 automatic mode, 0~100%: Y2 Output by manual operation

4.2 OPERATION (CX9230-M2 Model)

NO	Parameter	Default	Min.	Max.	View	Access	Description
4 0036	COMP1 RUN DIFF.	+2.0K	-99.9	+99.9	FREE	SERVICE	
4 0037	COMP1 STOP DIFF.	-2.0K	-99.9	+99.9	FREE	SERVICE	
4 0038	COMP2 RUN DIFF.	+4.0K	-99.9	+99.9	FREE	SERVICE	
4 0039	COMP2 STOP DIFF.	0.0K	-99.9	+99.9	FREE	SERVICE	

4.3 SCHEDULE

NO	Parameter	Run	Stop	View	Access	Description
200	SUN RUN~STOP	00:00	00:00	FREE	FREE	
201	MON RUN~STOP	08:00	18:00	FREE	FREE	
202	TUE RUN~STOP	08:00	18:00	FREE	FREE	
203	WED RUN~STOP	08:00	18:00	FREE	FREE	
204	THU RUN~STOP	08:00	18:00	FREE	FREE	
205	FRI RUN~STOP	08:00	18:00	FREE	FREE	
206	SAT RUN~STOP	08:00	18:00	FREE	FREE	

4.4 LOG

NO	Date	Time	.Occur/Reset	Event
1	YY / MM / DD	HH : MM	(Occur)	Event #1
2	YY / MM / DD	HH : MM	(Occur)	Event #2
3	YY / MM / DD	HH : MM	(Occur)	Event #3
I	YY / MM / DD	HH : MM	(Occur)	Event #4
50	YY / MM / DD	HH : MM	(Occur)	Event #50

4.5 MAINTENANCE

NO	Parameter	Default	Min.	Max.	View	Access	Description
400	SENSOR CHECK		0	32000	FREE	SERVICE	
401	SAFETY PARTS		0	32000	FREE	SERVICE	
402	ELECTRIC PARTS		0	32000	FREE	SERVICE	
403	COMP. PARTS		0	32000	FREE	SERVICE	
404	REFERIGERANT		0	32000	FREE	SERVICE	
405	OVERHAUL		0	32000	FREE	SERVICE	

4.6 TRIP

NO	Parameter	Default	Min.	Max.	View	Access	Description
4 0101	FLOW DETECT DLY	10Sec	0	999	USER	SERVICE	Flow detection alarm will detected after pump start and the lapse of flow detection delay time
4 0102	FLOW DETECT TIME	3Sec	0	99	USER	SERVICE	If flow detection signal detects status of without flow continuously, alarm will occur. Flow detection fault, alarm will occur (Comp. stops immediately)
4 0103	LP ALARM MODE	1	0	3	USER	SERVICE	0=Unuse: 1=Auto-Reset: 2=Checkd-Reset: 3=Forced-Reset:
4 0104	LP ALARM PRESS.	2.5bar	-1.0	99.9	USER	SERVICE	In case of setting USE in LO-PRESS. SENSOR [1104], input the lower limit of low pressure detection.
4 0105	LP ALARM RESET	3.5bar	-1.0	99.9	USER	SERVICE	In case of setting USE in LO-PRESS. SENSOR

							[1104],], input the lower limit of low pressure reset.
4 0106	LP ALARM DELAY	10Sec	0	999	USER	SERVICE	Input low pressure alarm delay time.
4 0107	LP ALARM TIME	3Sec	0	99	USER	SERVICE	If low pressure alarm signal detects during low pressure alarm delay time continuously, LP ALARM will occur. (Comp. stops immediately)
4 0108	HP ALARM MODE	2			USER	SERVICE	0=Unuse 1=Auto-Reset 2=Checkd-Reset 3=Forced-Reset:
4 0109	HP ALARM PRESS.	26.0bar	-1.0	99.9	USER	SERVICE	In case of setting USE in HI-PRESS. SENSOR [1105], input the upper limit of high pressure detection.
4 0110	HP ALARM RESET	24.0bar	-1.0	99.9	USER	SERVICE	In case of setting USE in HI-PRESS. SENSOR [1105], input the upper limit of high pressure reset.
4 0111	DSCHRG-LO ALARM	1			USER	SERVICE	0=Unuse 1=Auto-Reset 2=Checkd-Reset 3=Forced-Reset:
4 0112	DSCHRG-LO TEMP.	60℃	-50	50	USER	SERVICE	If discharge gas temperature is less than DSCHRG-LO ALARM and maintain continuous status during low temperature alarm delay time, DSCHRG-LO ALARM will occur. (Comp. runs normally, but in case of setting auto reset or Checkd-Reset in DSCHRG-LO ALARM, Comp. stops immediately). Deviation of DSCHRG-LO ALARM release is +5K
4 0113	DSCHRG-LO DELAY	300Sec	0	9999	USER	SERVICE	
4 0114	DSCHRG-HI ALARM	1	0	3	USER	SERVICE	0=Unuse 1=Auto-Reset 2=Checkd-Reset 3=Forced-Reset:
4 0115	DSCHRG-HI TEMP.	115℃	0	150	USER	SERVICE	If discharge gas temperature is higher than DSCHRG-HI ALARM and maintain it during discharge gas high temperature alarm delay, DSCHRG-HI ALARM will occur. (Comp. stops immediately) Deviation of DSCHRG-HI ALARM is -20K.

4.7 ALARM

NO	Parameter	Default	Min.	Max.	View	Access	Description
4 0121	LO-TEMP ALARM	1	0	3	FREE	SERVICE	0=Unuse 1=Auto-Reset 2=Checkd-Reset 3=Forced-Reset

4 0122	LO-TEMP AL.TEMP	4.0℃	-50.0	150.0	FREE	SERVICE	Temperature is less than low temperature alarm, low temperature alarm will occur. (Comp. stops immediately). Deviation of low temperature alarm release is +2.0K
4 0123	LO-TEMP AL.DELAY	60 Sec	0	9999	FREE	SERVICE	Working condition for temperature sensor
4 0124	HI-TEMP ALARM	1	0	3	FREE	SERVICE	0=Unuse 1=Auto-Reset 2=Checkd-Reset 3=Forced-Reset
4 0125	HI-TEMP AL.TEMP	20.0℃	-50.0	150.0	FREE	SERVICE	Temperature is less than high temperature alarm, outlet high temperature alarm will occur. Deviation of high temp. alarm release is -2.0K If high temp. alarm mode is auto-reset, comp. will not stop. In case of checkd reset or forced reset, comp. will stop immediately.
4 0126	HI-TEMP AL.DELAY	60 Sec	0	9999	FREE	SERVICE	Working condition for temperature sensor
4 0127	LP-HI ALARM MODE	1	0	3	FREE	SERVICE	0=Unuse 1=Auto-Reset 2=Checkd-Reset 3=Forced-Reset
4 0128	LP-HI AL.PRESS	12.0 Bar	-1.0	99.9	FREE	SERVICE	If low pressure is higher than the upper limit of alarm pressure and maintain it during LP-HI AL.DELAY, LP-HI ALARM will occur. Deviation of LP-HI ALARM release is -2.0K
4 0129	LP-HI AL.DELAY	60 Sec	0	999	FREE	SERVICE	
4 0130	HP-LO ALARM MODE	1	0	3	FREE	SERVICE	0=Unuse 1=Auto-Reset 2=Checkd-Reset 3=Forced-Reset
4 0131	HP-LO AL.PRESS	10.0 bar	-1.0	99.9	FREE	SERVICE	If high pressure is less than the lower limit of alarm pressure and maintain it during [611 HP-LO AL.DELAY], HP-LO ALARM will occur. (Comp. stops immediately) Deviation of HP-LO ALARM release is +5.0K
4 0132	HP-LO AL.DELAY	60 Sec	0	9999	FREE	SERVICE	

4.8 IN/OUT

NO	Parameter	Default	Min.	Max.	View	Access	Description
4 0141	ID1: COMP ALARM	2=N.Close	0	2	FREE	SERVICE	0=Unuse 1=N.Open 2=N.Close
4 0142	ID2: CONDENSOR AL	2=N.Close	0	2	FREE	SERVICE	
4 0143	ID3: REVERSE PHASE	2=N.Close	0	2	FREE	SERVICE	
4 0144	ID4: LOW LEVEL	2=N.Close	0	2	FREE	SERVICE	
4 0145	ID5: FLOW SWITCH	2=N.Close	0	2	FREE	SERVICE	
4 0146	ID6: PUMP ALARM	2=N.Close	0	2	FREE	SERVICE	
4 0147	ID7: FREEZE HEAT	2=N.Close	0	2	FREE	SERVICE	
4 0148	ID8: RUN/STOP	1=N.Open	0	2	FREE	SERVICE	
4 0149	N1:HEAT OUTPUT	2=Hotgas(PID)	0	4	FREE	SERVICE	0=Unuse, 1=Heat(PID) 2=Hotgas(PID) 3=Heat(Hys) 4=Hotgas(Hys)
4 0150	N2:COOL OUTPUT	2=Coolgas(PID)	0	4	FREE	SERVICE	0=Unuse, 1=Cool(PID) 2=Coolgas(PID) 3=Cool(Hys) 4=Coolgas(Hys)
4 0151	N3:COND OUTPUT	1=Use	0	1	FREE	SERVICE	0=Unuse, 1=Use
4 0152	N4:LINJ OUTPUT	1=Use	0	1	FREE	SERVICE	0=Unuse, 1=Use
4 0153	N5:PUMP OUTPUT	1=Use	0	1	FREE	SERVICE	0=Unuse, 1=Use
4 0154	N6:COMP OUTPUT	1=Use	0	1	FREE	SERVICE	0=Unuse, 1=Use
4 0155	N7:SOL OUTPUT	1=Use	0	1	FREE	SERVICE	0=Unuse, 1=Use
4 0156	N8:AUX OUTPUT	1=Alarm	0	4	FREE	SERVICE	0=Unuse 1=Alarm 2=Trip 3=Shutdown 4=Maintenance 5=All Alarm: Output if there is any alarm or trip occur 6=!Alarm: Output if it is not an alarm status 7=!Trip: Output if it is not a trip status 8=!Shutdown: Output if it is not a shutdown status 9=!Maintenance: Output if it is not a maintenance status 10=!All-Alarm: Output if there is no alarm 11=Run-State 12=Stop-State 13=Pump-Run 14=Comp-Run

							15=5 Sec Delay: Output after keeping 5 secs. after comp. output 16=10Sec Delay: Output after keeping 15 secs. after comp. output 17=15Sec Delay: Output after keeping 15 secs. after comp. output 18=30Sec Delay: Output after keeping 30 secs. after comp. output 19=60Sec Delay: Output after keeping 60 secs. after comp. output
4 0157	Y1 OUTPUT MODE	0=Unuse	0	14	FREE	MASTER	0=Unuse 1=Heat: Use as heating output 2=Hotgas: Use as hotgas output 3=Cool: Use as cooling output 4=Coolgas: Use as coolgas 5=Cond: Use as condenser fan output 6=Reserv1 7=Reserv2 8=Reserv3 9=Reserv4 10=PV: Use as PV transmission output 11=B1: Use as B1 transmission output 12=B2: Use as B2 transmission output 13=B3: Use as B3 transmission output 14=B4 :Use as B4 transmission output
4 0158	Y2 OUTPUT MODE	0=Unuse			FREE	MASTER	
4 0159	Y1 OUTPUT TYPE	0=4~20mA	0	2	FREE	MASTER	0=4~20mA: Forward direction output 1=20~4mA: Reverse direction output 2=SSR: SSR output
4 0160	Y2 OUTPUT TYPE	0=4~20mA	0	2	FREE	MASTER	

4.8 IN/OUT (CX9230-M2 Model)

NO	Parameter	Default	Min.	Max.	View	Access	Description
4 0151	N3:COMP2	1=Use	0	1	FREE	SERVICE	0=Unuse 1=Use
4 0152	N4:SOL2	1=Use	0	1	FREE	SERVICE	
4 0153	N5:PUMP	1=Use	0	1	FREE	SERVICE	
4 0154	N6:COMP1	1=Use	0	1	FREE	SERVICE	
4 0155	N7:SOL1	1=Use	0	1	FREE	SERVICE	

4.9 COMPRESSOR

NO	Parameter	Default	Min.	Max.	View	Access	Description
4 0161	COMPRES. INSTALL	1=Use	0	1	FREE	MASTER	0=Unuse 1=Use
4 0162	COMP RUN DELAY	3Sec	0	10	FREE	MASTER	Even if comp. is at starting condition, compressor will not be started during restart delay time after comp. turns OFF (To prevent frequent ON/Off of compressor)
4 0163	COMP RE-RUN TIME	60Sec	0	9999	FREE	SERVICE	
4 0165	PUMP-DOWN TIME	0Sec	0	999	FREE	SERVICE	Input pump down time of compressor
4 0166	PUMP-DOWN PRESS	0bar	-1.0	99.9	FREE	MASTER	Input pump down pressure
4 0168	CONDENSOR PRESS	24.0bar	-1.0	99.9	SERVICE	SERVICE	

4.9 COMPRESSOR (CX9230-M2 Model)

NO	Parameter	Default	Min.	Max.	View	Access	Description
4 0169	COMP1 USE	1=Use	0	1	FREE	MASTER	0=Unuse 1=Use
4 0170	COMP2 USE	1=Use	0	1	FREE	MASTER	0=Unuse 1=Use
4 0171	RUN/STOP SOURCE	0=Off	0	1	FREE	SERVICE	0=Off 1=On

4.10 FUNCTION

NO	Parameter	Default	Min.	Max.	View	Access	Description
4 0181	RUN/STOP SOURCE	1=Local	0	4	FREE	SERVICE	0=Both: Use both local mode and remote mode 1=Local: Control by keypad 2=Remote: Control by digital input(ID8) 3=Comm.: Control by Comm. 4=Schedule: Time set at schedule menu
4 0182	CONTROL SOURCE	0=Temp	0	1	FREE	SERVICE	0=Temperature: Control by temperature standard 1=Lpress: Control by press. standard (support at CX9240)
4 0184	AUX.SENSOR RATIO	0%	0	100	FREE	SERVICE	
4 0185	POWER RETURN	1=Use	0	1	FREE	SERVICE	0=Unuse, 1=Use
4 0187	PUMP Low Temp. On	4.0	-50.0	150	FREE	SERVICE	
4 0189	PUMP ON DELAY	3Sec	0	9999	FREE	SERVICE	
4 0190	PUMP STOP DELAY	10Sec	0	9999	FREE	SERVICE	

4.11 PID CONTROL

NO	Parameter	Default	Min.	Max.	View	Access	Description
4 0201	AUTO TUNE	0=Off	0	1	SERVICE	SERVICE	0=Off, 1=On: PID auto-tuning start
4 0202	PROPORTION. GAIN	5.0%	0.0	999.9	SERVICE	SERVICE	P Constant
4 0203	INTEGRAL TIME	120Sec	0	3600	SERVICE	SERVICE	I Constant
4 0204	DERIVATIVE TIME	30Sec	0	3600	SERVICE	SERVICE	D Constant
4 0205	HEAT HI. LIMIT	100%	0	100	SERVICE	SERVICE	The upper limit of heating control
4 0206	HEAT LOW LIMIT	0%	0	100	SERVICE	SERVICE	The lower limit of heating control
4 0207	HEAT ON/OFF PERI	5Sec	0	9999	SERVICE	SERVICE	Output cycle at setting NI as PID
4 0208	COOL HI. LIMIT	100%	0	100	SERVICE	SERVICE	The upper limit of cooling control
4 0209	COOL LOW LIMIT	0%	0	100	SERVICE	SERVICE	The lower limit of cooling control
4 0210	COOL ON/OFF PERI	5Sec	0	9999	SERVICE	SERVICE	Output cycle at setting N2 as PID
4 0212	COND. AUTO TUNE	0=Off	0	1	SERVICE	SERVICE	0=Off, 1=On: PID auto-tuning start
4 0213	COND. PROP. BAND	5.0%	0.0	999.9	SERVICE	SERVICE	P constant of condensation PID control output
4 0214	COND. INTEGRAL	120Sec	0	3600	SERVICE	SERVICE	I constant of condensation PID control output
4 0215	COND. DERIVATIVE	30Sec	0	3600	SERVICE	SERVICE	D constant of condensation PID control output
4 0216	COND. HI. LIMIT	100%	0	100	SERVICE	SERVICE	The upper limit of condensation PID control output
4 0217	COND. LOW LIMIT	0%	0	100	SERVICE	SERVICE	The lower limit of condensation PID control output
4 0218	COND. ON/OFF PER	5Sec	0	9999	SERVICE	SERVICE	Output cycle at setting N4 as PID
4 0219	AUTO TUNE GAIN				SERVICE	SERVICE	

4.12 SENSOR

NO	Parameter	Default	Min.	Max.	View	Access	Description
4 0221	B1 SENSOR				SERVICE	MASTER	0=Unuse 1=Use
4 0222	B2 SENSOR				SERVICE	MASTER	0=Unuse 1=Aux. 2=Discharge 3=Set Value
4 0223	B1 SENSOR OFFSET	0.0K	-99.9	+99.9	SERVICE	SERVICE	Input offset of B1 sensor.
4 0224	B2 SENSOR OFFSET	0.0K	-99.9	+99.9	SERVICE	SERVICE	Input offset of B2 sensor.
4 0225	LO-PRESS. SENSOR	0=Unuse	0	6	SERVICE	MASTER	0=Unuse 1=-1~15bar 2=-1~9bar 3=-1~10bar 4=0~30bar 5=0~50bar 6=-1~50bar
4 0226	HI-PRESS. SENSOR	0=Unuse	0	6	SERVICE	MASTER	
4 0227	LO-PRESS. OFFSET	0.0K	-99.9	+99.9	SERVICE	SERVICE	Input offset of low pressure sensor.
4 0228	HI-PRESS. OFFSET	0.0K	-99.9	+99.9	SERVICE	SERVICE	Input offset of high pressure sensor.

4.13 CONGIG

NO	Parameter	Default	Min.	Max.	View	Access	Description
4 0241	LANGUAGE SELECT	0= Korean	0	1	FREE	USER	0=Korean, 1=English
4 0242	MASTER CODE	119	1	9999	MASTER	MASTER	Set master code.
4 0243	SERVICE CODE	100	1	9999	SERVICE	SERVICE	Set service code.
4 0244	PARAMETE INITIAL	0=NO	0	1	MASTER	MASTER	0=NO, 1=YES
4 0245	RUN INFO ERASE	0=NO	0	1	MASTER	MASTER	0=NO, 1=YES
4 0246	ALARM LOG ERASE	0=NO	0	1	MASTER	MASTER	0=NO, 1=YES
4 0247	COMM.ID	0	0	256	FREE	USER	Set comm. ID
4 0248	COMM. BPS	1=9600	0	3	FREE	USER	0=4800, 1=9600, 2=19200, 3=38400
4 0249	SENSOR IN FILTER	5.0 Sec	0.0	99.9	MASTER	MASTER	Set input filter of sensor. The bigger the more stable, but it will be slow to respond.
4 0250	ALARM BUZZER	1=Use	0	1	FREE	USER	0=Unuse, 1=Use
4 0251	Y1JERK LIMIT	100%	0	100	FREE	USER	
4 0252	Y2JERK LIMIT	100%	0	100	FREE	USER	
4 0253	ID7 FUNCTION	0	0	1	MASTER	MASTER	0=FREEZE, 1=OVERHEAT

4.15 FACTORY

NO	Parameter	Default	Min.	Max.	View	Access	Description
1400	Factory Test		0	1	SERVICE	FACTORY	
1401	B1 Input		0	9999	SERVICE	LOCK	
1402	B2 Input		0	9999	SERVICE	LOCK	
1403	B3 Input		0	9999	SERVICE	LOCK	
1404	B4 Input		0	9999	SERVICE	LOCK	
1405	B3 4mA		0	9999	SERVICE	FACTORY	
1406	B3 20mA		0	9999	SERVICE	FACTORY	
1407	B4 4mA		0	9999	SERVICE	FACTORY	
1408	B4 20mA		0	9999	SERVICE	FACTORY	
1409	Y1 4mA		0	9999	SERVICE	FACTORY	
1410	Y1 20mA		0	9999	SERVICE	FACTORY	
1411	Y2 4mA		0	9999	SERVICE	FACTORY	
1412	Y2 20mA		0	9999	SERVICE	FACTORY	
1413	ADC filter		0	99	SERVICE	FACTORY	
1414	DAC filter		0	99	SERVICE	FACTORY	

6. PROTOCOL

6.1 COMMUNICATIONS SPECIFICATIONS

Item	Description
Transmission line connection	Multiple line
Communications method	RS485 (2-wire, half-duplex)
Baud-rate	BPS default 9600 BPS
Parity, Data, Stop bit	None, 8 Data, 1 Stop
Protocol Type	Modbus RTU MODE
Function Code	Read HOLD REGISTERS (0x03) / Preset Single Register (0x06)
Maximum Read Word	32 Word
Media Type	BELDEN 9841 / 9842, LG LIREV-AMESB
Poll interval	100msec

6.2 INPUT STATUS – DIGITAL INPUT PORT

Address	Menu	Unit	Type	Size (Word)	CX9230	MMI	Custom
3 0001	Digital Input Signal State	-	Analog	UINT 16	Refer to bit state below		
Bit 0	Digital Input ID1 Signal	-	Digital	Bit	0 : OFF	1 : ON	
Bit 1	Digital Input ID2 Signal	-	Digital	Bit	0 : OFF	1 : ON	
Bit 2	Digital Input ID3 Signal	-	Digital	Bit	0 : OFF	1 : ON	
Bit 3	Digital Input ID4 Signal	-	Digital	Bit	0 : OFF	1 : ON	
Bit 4	Digital Input ID5 Signal	-	Digital	Bit	0 : OFF	1 : ON	
Bit 5	Digital Input ID6 Signal	-	Digital	Bit	0 : OFF	1 : ON	
Bit 6	Digital Input ID7 Signal	-	Digital	Bit	0 : OFF	1 : ON	
Bit 7	Digital Input ID8 Signal	-	Digital	Bit	0 : OFF	1 : ON	

6.3 INPUT STATUS – DIGITAL OUTPUT PORT

Address	Menu	Unit	Type	Size (Word)	CX9230	MMI	Custom
3 0002	Digital Output Signal State	-	Analog	UINT 16	Refer to bit state below		
Bit 0	Digital Output N1 Signal	-	Digital	Bit	0 : OFF	1 : ON	
Bit 1	Digital Output N2 Signal	-	Digital	Bit	0 : OFF	1 : ON	
Bit 2	Digital Output N3 Signal	-	Digital	Bit	0 : OFF	1 : ON	
Bit 3	Digital Output N4 Signal	-	Digital	Bit	0 : OFF	1 : ON	
Bit 4	Digital Output N5 Signal	-	Digital	Bit	0 : OFF	1 : ON	
Bit 5	Digital Output N6 Signal	-	Digital	Bit	0 : OFF	1 : ON	
Bit 6	Digital Output N7 Signal	-	Digital	Bit	0 : OFF	1 : ON	
Bit 7	Digital Output N8 Signal	-	Digital	Bit	0 : OFF	1 : ON	

6.4 INPUT STATUS – TRIP / ALARM STATE

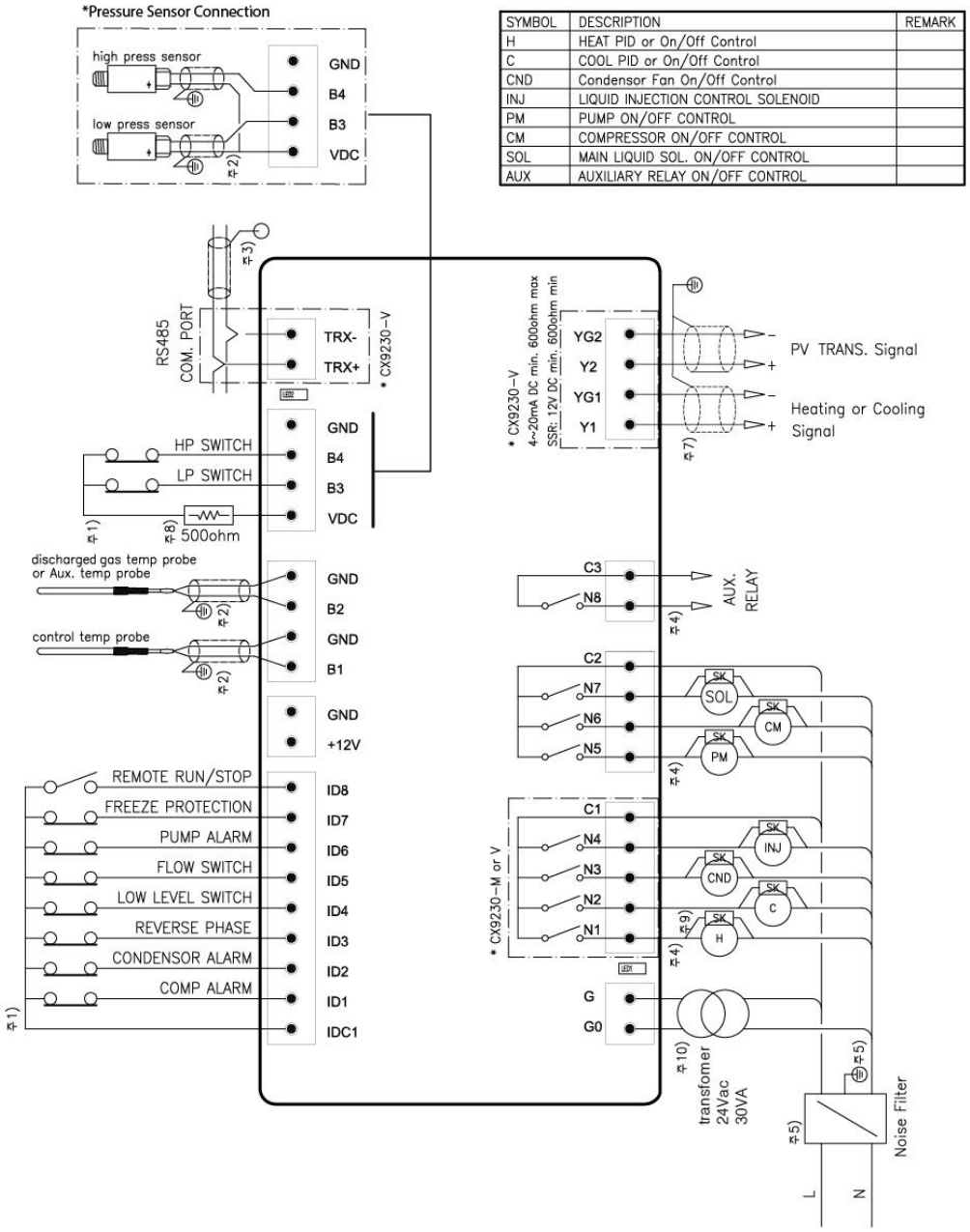
Address	Menu	Unit	Type	Size (Word)	CX9230	MMI	Custom
3 0003	TRIP STATE	-	Analog	UINT 16	Refer to bit state below		
Bit 0	SYSTEM FAULT	-	Digital	Bit	0 : Normal	1 : Alarm	
Bit 1	CTRL.T SENSOR	-	Digital	Bit	0 : Normal	1 : Alarm	
Bit 2	AUX.T SENSOR	-	Digital	Bit	0 : Normal	1 : Alarm	
Bit 3	DSCHG.T SENSOR	-	Digital	Bit	0 : Normal	1 : Alarm	
Bit 4	LP-PRESS. SENSOR	-	Digital	Bit	0 : Normal	1 : Alarm	
Bit 5	HP-PRESS. SENSOR	-	Digital	Bit	0 : Normal	1 : Alarm	
Bit 6	COMPRESSOR ALARM	-	Digital	Bit	0 : Normal	1 : Alarm	
Bit 7	CONDENSOR FAN	-	Digital	Bit	0 : Normal	1 : Alarm	
Bit 8	REVERSE PHASE	-	Digital	Bit	0 : Normal	1 : Alarm	
Bit 9	LOW LEVEL	-	Digital	Bit	0 : Normal	1 : Alarm	
Bit 10	NO FLOW DETECT	-	Digital	Bit	0 : Normal	1 : Alarm	
Bit 11	PUMP ALARM	-	Digital	Bit	0 : Normal	1 : Alarm	
Bit 12	LO-PRESS	-	Digital	Bit	0 : Normal	1 : Alarm	
Bit 13	HI-PRESS	-	Digital	Bit	0 : Normal	1 : Alarm	
Bit 14	FREEZE OFF	-	Digital	Bit	0 : Normal	1 : Alarm	
3 0004	TRIP STATE	-	Analog	UINT 16	Refer to bit state below		
Bit 0	LO-TEMP ALARM	-	Digital	Bit	0 : Normal	1 : Alarm	
Bit 1	HI-TEMP ALARM	-	Digital	Bit	0 : Normal	1 : Alarm	
Bit 2	DSCHG LO-TEMP	-	Digital	Bit	0 : Normal	1 : Alarm	
Bit 3	DSCHG HI-TEMP	-	Digital	Bit	0 : Normal	1 : Alarm	
3 0005	ALARM STATE	-	Analog	UINT 16	Refer to bit state below		
Bit 0	SENSOR CHECK	-	Digital	Bit	0 : Normal	1 : Alarm	
Bit 1	SAFETY PARTS	-	Digital	Bit	0 : Normal	1 : Alarm	
Bit 2	ELECTRIC PARTS	-	Digital	Bit	0 : Normal	1 : Alarm	
Bit 3	COMPRESSOR PARTS	-	Digital	Bit	0 : Normal	1 : Alarm	
Bit 4	REFERIGERANT	-	Digital	Bit	0 : Normal	1 : Alarm	
Bit 5	OVERHAUL	-	Digital	Bit	0 : Normal	1 : Alarm	

6.4 INPUT STATUS – STATE DATA

Address	Menu	Unit	Type	Size (Word)	CX9230	MMI	Custom
3 0001	Digital Input Port State	-	Analog	UINT 16			
3 0002	Digital Output Port State	-	Analog	UINT 16			
3 0003	Trip State High	-	Analog	UINT 16			
3 0004	Trip State Low	-	Analog	UINT 16			
3 0005	Alarm State High	-	Analog	UINT 16			
3 0011	Current Temp.	℃	Analog	INT 16	-40.5 ~ 105.0	X 10	
3 0012	Current Low Press.	bar	Analog	INT 16	-1.0 ~ 15.0	X 10	

3 0013	Current High Press.	bar	Analog	INT 16	-1.0 ~ 50.0	X 10	

CX9230 Wiring diagram



SYMBOL	DESCRIPTION	REMARK
H	HEAT PID or On/Off Control	
C	COOL PID or On/Off Control	
CND	Condensor Fan On/Off Control	
INJ	LIQUID INJECTION CONTROL SOLENOID	
PM	PUMP ON/OFF CONTROL	
CM	COMPRESSOR ON/OFF CONTROL	
SOL	MAIN LIQUID SOL. ON/OFF CONTROL	
AUX	AUXILIARY RELAY ON/OFF CONTROL	