Universal Intelligent Controller for HVAC&R Applications

DX series

HVAC Controller : **DX100**, **DX120**, **DX140** Screw Compressor : **DX200**, **DX220**, **DX240**, **DX270** Recipro/Scroll Controller : **DX230** Multi Rack Controller : **DX260** Heat Pump Controller : **DX230H**, **DX540H**







DX Series Universal Inteligent Controller

Features of DX series

Simple Operation & Authorization Setup Function Per Each Access Code

Because of easy and intuitional menu constitution settable by users, DX series is convenient for operation setup and communicability, and it embeds authorization setup function per each access code, so that it can prevent the equipments from malfunction.

Also, it can provide users with very reasonable price in contradistinction with cost in spite of a combination of network ability and control function.

Big Size Graphic LCD (240x128, 5 inch)

DX series applies for big size graphic LCD which makes it possible to provide users with several languages (Korean, Chinese, English and Japanese). Also, it maximizes users' convenience by supporting both graphic and text interface. (Wide temperature range type :-20~70 \degree)

Error Message & Alarm Display (Operation Status Recording Devise Embedded)

DX series can display error information such as failure or malfunction of the equipments with a simple message, so users or engineers can check and manage the equipments. Also, it can save maximum 200 shut down histories and states when error occurred, so it provides users with easy analysis of problems. (Embedding black box function)

Reliable Preventative and Maintenance Function

DX series provides users with the information about a cycle of PM and consumable parts exchanging schedule which is very helpful not only to maintain good state of the equipment but also to save PM cost.

Solution against Noise from the External Environment

It is a mandatory requirement to have a solution against noise as an industrial controller. DX series has insulated digital input and output signal which prevents the external signal from going into inside of main board. And, Watch Dog timer is operating in CPU per every 32msec which automatically recovers from CPU down occurred by noise.

Also, brownout function is embedded in CPU inside for a real-time detection of control power.

Various Analogue Output Function

DX series can basically use 3 of 4~20mA output. 3 of analogue output can be applied for the required controlling or transmitting output according to users' setting.

RS485 Communication Function

Applying for RS485 communication method based on MODBUS RTU/ASCII Protocol, DX series helps users to construct convenient SCADA/HMI system which is possible for precise central concentrated monitoring with PLC, PC, and touch screen.

Compact & Slim Size

Because of unified type of main control part and display part, the size of compressor can be minimized by securing enough places.

Various Sensor Lineups

DX series can be used with various lineups of DOTECH's sensors for temperature, humidity, pressure and differential pressure, so it provides users with excellent compatibility and extended application.

IP65 Certification

DX series has passed IP65 front side test, so it is possible to be used in poor environment, such as dusty and humid place.



Composition of DX series



Product category for various applications

DX series is composed of various applications like HVAC, screw, scroll, multi, ground/water source heat pump and air compressor, user can use various functions of DX series if user buy it depending on their purpose.



DX100 series based on microprocessor has realized the best control and stability with efficient control for HVAC units (AHU, constant temperature & humidity unit and dehumidifier) and perfect interface with safety devices. Its elegant graphic LCD display and LED helps users to check the current state of the units.

- Temperature & humidity control function, Max. 6 loop of independent step operating function
- Alternative operation by max. 4 compressors and 8 heaters
- Backup operating function
- Prevention from frequent starting failure occurred by low pressure hunting using low pressure switch in compressor
- Successive starting function, pump down function and prevention from restarting function
- Control function for cold water, hot water, steam valve, SCR, damper designed for HVAC (4~20mA PID control)
- Detection of error in temperature and humidity sensor, Alarm function, Output of equipment state
- (Cooling and Dehumidification, Heating and Humidification)

Models & Main Specification

- DX100 : HVAC Controller (2Comp) - DX120 : HVAC Controller (4Comp) - DX140 : Exclusive controller for constant temp. and humidity unit

Models Main Specification	DX100 DX120	DX140	Models Main Specification	DX100 DX120	DX140
Digital Input Port	10	10	Trip / Alarm Recording Function	OK	-
Digital Output Port	12	12	Schedule Run/Stop Function	OK	-
Temperature Sensor Input	2	1	Cool / Dehumidify Analog Control	OK (PID control)	OK(P control)
Humidity Sensor Input	1	1	Cooling Analog Control	OK (PID control)	OK(P control)
Diff. Pressure Sensor Input	1	-	Heating Analog Control	OK (PID control)	OK(P control)
Refrigerator Compressor Control Step	2 4	2	Humidify Analog Control	OK (PID control)	OK(P control)
Heater Control Step	7	5	Diff. Pressure Analog Control	OK (PID control)	OK(P control)
Humidify Control Step	4	2	Temperature Retransmission Output	OK	-
Dehumidify Control Step	4	-	Humidify Retransmission Output	OK	-
Main Brower Fan on/off Control	1	1	Diff. Press. Retransmission Output	OK	-
Dehumidifier Control Function	OK	-	React Heater SCR on/off Control	OK	-
React Heater Temp. Sensor Input	OK	-	Heater SCR on/off Control	OK	-
React Heater Control Function	OK	-	Humidify Heater SCR on/off Control	OK	-
React Heater Control Step 4 -	4	-	Cooling State on/off Control		_
React Fan on/off Control 1 -	1	-	Cooming State on/on Control	UK	

Set Temperature / Humidity / Diff. Press / React temperature

• COOL CONTROL DIFFERENCE

Input standard been driving/suspension control sensitivity of cooling control. (Figure, When 2 Cycle Compressor Control)



HUMIDITY CONTROL DIFFERENCE

When drive humidification, input control sensitivity that get into standard of step driving of humidifier.





Input standard been driving/suspension control sensitivity of Heating control.





DX100 / DX120 / DX140

 DEHUMIDIFY CONTROL DIFFERENCE Input standard been driving/suspension control sensitivity of dehumidification control. (Figure, When 2 Step Control) In case is cooling dehumidification operation mode, decide driving step of freezing machine.



When control react heater in dry type of dehumidifier, if [CONTROL SET: REACT HETER CONTROL] is OFF, it controls react heater's step according to current humidity.

Applications

Screen Composition





When control react heater in dry dehumidifier, control step of react heater according to present react heater temperature if [CONTROL SET:REACT HEATER CONTROL] is ON..(Figure, When 2 Step Control)

- Constant temperature & humidity unit
- AHU
- Dry type dehumidifier
- Various types HVAC system

MENU Composition







DX200 series based on microprocessor has realized the best control and stability with deciding and controlling capacity adjustment timing for screw compressor and perfect interface with safety devices.

- Efficient step/stepless control, convenience for operation and inspection
- One-touch setup function (Choosing the maker -> Automatic setup according to their basic spec.) (Bitzer, Hitachi, Refcomp, Fusheng, Hanbell, Mitsubishi, Roltec, Kobe)
- Strong timer function (Step delay, Start delay, Auto-stop delay, Restart delay, Pump down delay)
- Temperature control, Pressure control (input temperature, output temperature, Intake pressure control, Discharge gas temperature control and observation)
- DX200 : 1 Cycle Screw Compressor Controller
- DX220 : 1~2 Cycle Screw Compressor Controller
- DX240 : 1~4 Cycle Screw Compressor Controller
- DX270:1 Cycle Screw Compressor Controller (Step Control)
- DX200H : 1 Cycle Screw Heat Pump Compressor Controller
- DX220H : 1~2 Cycle Screw Heat Pump Compressor Controller

Applications

Screen Composition

Current Temperature





- Water cooled & air cooled screw compressor

- Chiller, CDU, Spot-Cooler

MENU Composition

- HeatPump System



Lock Signal

Discharge Gas Temperature Equipment State Code Set Temperature Discharge Gas Temperature

Current Time

Alarm Message

Equipment State Code



7.0 14 °c D.C GAS \$1ª \$2ª \$3ª SOL CM CY CD LIS ALR PM 08:20 Digital Output State Operation State LÕC STP GOOD START READY OCC REV LPS HPS OLS OVH Digital Input State FS PIL RET -0 51 Lock Signal

Wiring Diagram (DX200: Stepless)

OX270 (Step)





DX200 series based on microprocessor performs best operation (control) automatically according to set condition and unit's operation status which conducting efficient operation of 1-2 cycle compressor.

- Stepless Capacity Control Type / built in equal control function
- Adapted wide graphic LCD, displaying Korean / English / Chinese
- Easy to analyze the cause of troubles because of storing 160 histories of trip message
- Embeded day-timer to enable energy-saving operation
- Various analog output function
- (Outlet temperature / Discharge gas temperature transmission)
- Various applications (Chiller, CDU, Start control panel)
- User can use this model regardless of compressor's maker (can set up Capacity Control Type)
- User have only to input maker and setting of capacity Control valve is finished)
- DX220(H)-00 : Basic model
- **DX220(H)-11** :Temperature transmission output function + RS485 communication (Modbus RTU) *H : Exclusive model for heat pump

Applications





- Water cooled & air cooled screw compressor - Chiller, CDU, Spot-Cooler
- HeatPump System

MENU Composition

Screen Composition





Wiring Diagram (DX220)

		LHC-DX-220 8	BERIES			-		-	100
		TERMINAL	DESC.	LEGEND	LEGEND	DESC.	TERM	NAL NO	I Y
BURGE AC TRANSFORMER		41-1	FG		LOAD CONTROL INCREASE SOL	N1	CH-0	221 - 1	+-(n)
	GO(NEUTRAL)	31-2	G0	CONTROLLER	LCAD CONTROL DEGREASE SOL	N2		221 - 2	(R2)
		21-3	G	Policy and	COMP#1 MC for Main / PW1	N3		121-5	
جرور القرار القرار المالية الم	G (HOT)	J11+1	+VDC	E annual Contraction of	COMPET Detra / PW2 / Stort SOL	N4		J21 + 4	(N4)-{
2 200VACION PUSE		J11-2 J11-3	B4 B5	Later Trans Groups	OUTPUT COMMON 1	C1	L	221-5	+
		111-4	GND	met remp berno					10
		212 - 1	81	DP GAS TRUE IN	Liqued SQL	N5	L+	322 - 1	+(R5)
		212.3	GND B2		SOL In Liquid Injection	N6		322-2	+(Ri)-{
		312-4	GND B3	Dudiel Temp Sensor	COMP#2 NC for Main / Piv/1	N7		122 - 8	(10)
	QWOORI PWRL INTI			Conotti Tolai Alena	COMP02 Date / PIV2 / Start SDL	N8		322-4	
		113 - 1	101	(전프+1 홍강 높台)	CUTPUT COMMON 2	C2		122 - 5	
	00	813-2	102	(第四41) 以第六批41	-	-	-	1	
		113-5	1D3	ComptHLP Switch (프로ન) 거외스위키)	COMP#2 Lisuid SOL	N9	HH-O	123 - 1	(R0)
	OLS1 er GFAN1 or INT1	13+4	1D4	Compile SELECTIVE ALARM	COMP#2 SOL for Liouid Intention	N10		123 - 2	(R10)-{
		113+6	IDs	Compilit Total Alarm	ALARM(TOTAL)	N11		123+5	+-(811)
	G(HOT)	213.8	IDC1	E COMMON 1	PUMP Charles contract	N12		323 - 4	(R12)
	4682		1		OUTPUT COMMON S	сз	_	423-5	
	00	314 - 1	ID6	CGH47 JEAN31	Araton Chilmut &-20mA (C)	aly DX23	G-ty Model	0.008.4	1
		J14-2	ID7	Complity LP Switch	CULTURAPPRESS PETRANS	Y1	+=-0	36-1	0.0.08
	OLS2 or CFAN2 or INT2	314.5	ID8	Carry#2 SELECTIVE 4L4PW	DC GAS TEMPET RETRANS	¥2	*==0	36-3	10.000
	Interlops PumpiPan) or Figur Switch	214 - 4	109	Harbor PUMP/FANy Flow	DC GAS TEMPS RETRANS	Y3	+==0	36-5	10 08
	O O Remole Runtilico	14.5	1010	Reside On/Off Signal		193		1 4014	# Shield Wite Use
	G (HOT)	314 - 6	1002	ID COMMON 2					Graund
		OUTPOR	1.0.08	(그러철 김후 송형 기					
	MMI CONNECTION (Shiy DX225-c1 Model)	TB1 1 TB1 2 TB1 - 2 TB1 - 9	SG B A	SYSYEM BUS RS46년 (네스턴 웹스 바스)					
		• OPTION T62 1 182 - 2 T82 - 3	SG B A	LOCAL BUS R5485 (조망 위장 유산 버스)					



The control logic of DX230 designed for recipro & scroll compressors has realized the best control and stability with controlling capacity and run/stop of compressors and perfect interface with safety devices. Its elegant graphic LCD display and LED helps users to check the current state of the units. Also, it provides users with the information about PM & trip alarm history for quick and easy treatment.

- Efficient control of recipro / scroll compressors
- Variable applications (Chiller, CDU, Spot-cooller)
- Strong storing and/or monitoring function for trip alarm history/state (Max. 200 cases)
- Strong timer function (Start delay, Restart delay, Pump down delay)
- Temperature control, pressure control
- (Inlet temperature, Outlet temperature, Intake pressure control, Discharge gas temperature control and observation)

Applications



- Water cooled & air cooled compressor - Chiller, CDU, Spot-Cooler

- HeatPump System

Screen Composition

MENU Composition



Wiring Diagram (DX230)



DX260 series has realized the best control and stability with ideal control of the number of equipment, such as equal & backup operation and perfect interface with safety devices. Its elegant graphic LCD display and LED helps users to check the current state of the units. Also, it provides users with the information about PM & trip alarm history for quick and easy treatment.

- Suitability for rack control of multi condensing unit
- Control for max. 8 compressors and 8 condensing fans
- (Basic : 4 compressors + 4 condensers)
- Efficient control for the number of equipment
- (Setting On/Off value per individuals and/or per between steps)
- Perfect equal control (Within 1 hour difference of the total accumulated operation time)
- Pressure/temperature control (Individual and/or interlocking control for intake pressure, discharge pressure)
- Strong storing and/or monitoring function for trip alarm history/state (Max. 200 cases)
- Optimal function for condensing fan speed control (4~20mA PID control)
- Transmission output function (Pressure / Temperature transmission)
- PC monitoring system using RS485 communication based on MODBUS protocol

Applications





Multi Condensing UnitMulti Compressor Control

Screen Composition



Wiring Diagram (DX260 : Comp4 + Fan4)







DX230H which is an optimal control algorism designed for heat pump system has realized the best control and stability with ideal control and perfect interface with safety devices. Its elegant graphic LCD display and LED helps users to check the current state of the units. Also, it provides users with the information about PM & trip alarm history for quick and easy treatment.

- Basic built-in control function for 1 cycle, 1~2 cycle
- Embedding the best control algorism for heat pump system
- Observation for input temperature of heat source & output temperature
- (Generating alarm & trip against high & low temperature) - Observation for input control temperature & output temperature
- (Generating alarm & trip against high & low temperature)
- Observation & control for discharge gas temperature (Liquid injection function embedded)
- 4-way valve control and/or selected operation for cooling and heating
- Sequential and alternative operation in case of 2 cycle control
- Strong storing and/or monitoring function for trip alarm history/state (Max. 160 cases)
- Transmission output (Temperature transmission)
- PC monitoring system using RS485 communication based on MODBUS protocol

Applications







- Geothermy & Water-cooled Heat Pump - Air-cooled Heat Pump

- Waste Heat Recovery Pump

MENU Composition

MENU SELECT

SCHEDULE

TRIP LOG

Screen Composition









OPERATIO COOL SET VALUE : 7.0 COOL SET VALUE NIGHT : 7.0 COOL RUN DIFFERENTIAL : +1.0

HEAT RUN DIFFERENTIAL : -1.0 °C

TRIP LOG

080102 15:55 POWER ON F 01 080102 16:10 POWER ON

TRIP LOG STATE

OPERATING(Y/D) GEO TEMP: 24.8

 01
 030102
 10:10
 FOWER ON

 02
 080102
 16:30
 COMP OCR

 03
 080102
 16:30
 POWER OFF

 04
 080102
 16:45
 x COMP OCR

COMP OCR

OUT : 15.0°C

ID (10~1): N (12~1):

HEAT SET VALUE

7.0 °C 7.0 °C

30.0 °

080102 16:30

HP: 12.1

UIC DX540H is a ideal controller for air source heat pump. It is based on microprocessor and designed with algorithm optimised for air source heat pump. UIC DX540H operates efficiently and manages intensively refrigerant compressor of heat pump. It promotes energy-saving through judge and control timing of capacity regulation. UIC DX540H is a system to prevent occurrence of problem by alarming and inform of necessary maintenance.

- Adoption RISC MICOM with high reliability
- Large graphic LCD which can display in Korean, English and Chinese
- Easy to maintain and analyse troubles of equipment by storing 160 trip alarms log
- The best calculation function of defrosting timing by various combination of 8 sources
- Embedded day-timer to enable energy-saving operation
- Easy expansion due to various analog transmission output function
- Alarm function to inform of time to maintain and change expendables through automatic calculation
- Additional state output 4 relays for suction temperature, water temperature, evaporation temperature, etc.

Applications



- Air source heat pump

Screen Composition

MENU Composition



Wiring Diagram (DX540H)





Basic Specification

Power spec.	Input Power	AC24V 50/60Hz, DC24V		Туре	RS485 (Half-Duplex Type) 1 channel (MODBUS RTU)
	Consumption	Max. 20VA	-	Speed	4800, 9600, 19200, 38400 BPS(default 9600)
CPU/LCD	CPU	ATmega 128, 16MHz	Communication		Parity None, Data 8bit, Stop 1bit
			-	Distance	Max. 1.2 km
	LCD	240 X 128 Pixel, LED Backlight		Cable	BELDEN 9842 or 8761
Digital Input	Туре	Opto-Isolation		Temp. Sensor	NTC x 3 (Max. 5)
	Number	10 (5X2 Common)	Analogue	4~20mA	2 (Build-in power 24V for sensor)
	Signal Power	AC24V or DC24V	Input	Difference Correction	Software
Digital Output	Туре	Relay contact	A	Channel No.	3 Channel
	Number	12 (4X3 Common)	Analogue	Туре	4~20mA
	Relay Contact Spec.	250V, 10A	Output	Setup Type	Software
Installation Environment	Location	Indoor	Installation	Storing Temp.	-30~80℃
	Operation Temp.	-10~60 °C	Environment	Operating Humidity	5~95 in No condensation state

Dimensions



Humidity & Temperature Transmitter



HTX23 OEM Temp. & Humidity Sensor



HTX32C Indoor Temp. & Humidity Transmitter

Temperature Sensor

DPR-TH2-P6D-100L

Sensor type∶NTC 10KΩ Range∶-40 ~ 150℃ ő Accuracy∶±1.5℃ at 25℃ Sheath : Φ 6 X 100mm, SUS Protection : IP67

DPR-TH1-S6D100L

Sensor type : NTC 5KQ Range : -50 ~ 105℃ Accuracy∶±0.3℃ at 25℃ Sheath : Φ 6 X 100mm, SUS Protection : IP67

Cable : 2C X 0.5mm, sus-mesh shield tefron

DPR-TH1-H6D100L

Sensor type : NTC 5KQ Range : -50 ~ 105℃ Accuracy∶±0.3℃ at 25℃ $\texttt{Sheath}: \Phi \mathrel{\texttt{6}} X \mathrel{\texttt{100mm}},$ SUS Protection : IP67 Cable : 2C X 0.5mm















HTX62C/D Industrial Temp., Humidity &



HTX72/73C Climate Control Temp., & Humidity Transmitter

Pressure Sensor

DP510

Measuring range : 0 ~ 16bar, 4~20mA Accuracy : Within 1%FS Size : Small type Temperature Range : -40 ~ 125 °C Applications : Automobiles & Heavy Equipments, Oil & Air Pressure Systems, Compressors, Industrial Engines, Pump Pressure Controls

506.933A/506.930A

DOTECH OEM Model : 506.933A - For High Pressure (0~30bar) DOTECH OEM Model : 506.930A - For Low Pressure (-1~9bar)

- Measuring pressure in pipe (water, oil, gas)
- Applying for all the refrigerants including ammonia (for freezing) - EMC conformity
- Accuracy : ±0.5% FS
- Using Temperature : −40 ~ 125 °C
- Insulation Class : IP67
 Output : 0~5V, 8~33VDC, 3wire
- 0~10V, 11.4~33VDC
- 16~34VDC/24VAC

www.gemilangreksabuana.com

4~20mA, 8~33VDC, 2wire



HTD500 Ultra-precise Indoor Type Temp.& Humidit Transmitter





SENSING & CONTROL





CX9230 series[®]

Smart Chiller Controller CX9230

High precision super PID control algorithm completed by autotuning technologies

Accurate temperature measurement and rapid and elaborate noise filtering

Powerful Trip Data Log(Max. 100)

Various I/O controls

Multilingual support for menus and parameters(Korean/English)

DOTECH, INC

Smart Chiller Controller CX9230



CX9230 series®

*The Wolrd Best High Precision Super PID Control Algorithm With super PID control algorithm developed by Dotech's innovative technologies, the precise ± 0.1 °C control based on auto tuning is provided at unbelievable price. CX9230 transforms your chiller into a smart one.

*Dual Sensor Input Processing Dual sensors culminated by Dotech's temperature control technologies and knowhows measure the inlet and outlet temperatures and remove the noise rapidly and elaborately. Sensored temperatures set according to each proportion enables an ideal temperature control.

* Powerful Trip Data Log Like DX Series, CX has a powerful trip data log. Up to 100 events can be traced and operators can handle the situations flexibly and exactly.

* Various Analog Outputs 2-channel analog outputs(4~20mA) are for heating/cooling control and can be applied to computed heating/cooling or condenser fan control. SSR control output can be set easily.

* Multilangual Support

Multilanguages are supported(Korean and English).

*Flexible and Reasonable Choice at Competitive Price Depending on the requirements and applications, the desired one can be selected among the specified models.

Front layout



Specifications

		CX9230C-L1	CX9230C-L	СХ9230С-М	CX9230D-V			
Power		24Vac, 50/60Hz						
Power Consi	umption	MAX 20VA						
Disital	Input	8EA(1 Common)						
Digital	Output	4P relay	outputs	8P relay outputs				
Angles	Input	2P temperature sensors, 2P 4~20mA						
Analog	Output	_	_	_	2P 4~20mA or SSR			
RTC (Real Time Clock)		_	0	0	0			
PID control logic		_	_	0	0			
Communication (MODBUS RTU / RS485)		_	_	_	0			
Electrical Cor	nnection	Screw terminal						
Display / But	ton	WIDE LCD(128X64) / TACTILE BUTTON						
Operating Condition		-10~50°C(Humidity 90%RH or less)						
Storage Con	dition	-20~60°C(Humidity 90%RH or less)						

Culmination of Sensing and Control Technologies by Dotech CX9230 series®

Dimensions



Temperature sensor



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



Discharged gas temperature sensor

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



Pressure sensor





Power trans

24069001



Wiring Diagram



1) Please separate the external contact input line from power line. Please use the dry contact(relay contact and etc.) Please separate the external contract input line from power line. Please use the dry contact for external contact.
 Please use the separate shielded wires for sensors.
 Please use the dedicated cable(BELDEN9841 or higher) for communicatino line.
 Please use a the AC cable and AC control line from a digital signal line or a sensor wire.
 Please use a noise filter and it must be grounded.
 Please use a spark killer for inductive load.

- 7) Please be cautious about polarity of 4~20mA/SSR output signal. The wrong connection may cause a failure. 8) Please use a resistance of 500ohm(over 1/4W).
- 9) If load resistance exceeds the relay capacity, please use an auxiliary relay. If an auxiliary relay and a solenoid use the same load resistance, it may cause malfunction or failure of relay. Please insert the protection devices for spark elimination in parallel for use.

- For AC, please use a CR spark killer(0.1uF+120ohm). For DC, please use a diode(1N4007). 10) Please use an 24Vac/30VA double wiring power transformer.
- Allowable voltage is 18~27Vac. When a power input is unstable, please use a 24Vac/1A power transformer

* Warning: To avoid EMI, please separate the sensor probes and the digital Warning: To avoid EMI, please separate the sensor probes and the digital input signal cables from the cables to deliver load resistance and the power cable.
Warning: Please do not place the power cable including electric panel wiring and the signal cable in the same pipe.
Please use 2sq or higher wires for groudning and wire according to the third grouding(ground resistance 100ohm or less). Please wire the ground cable within 20m.
Please do the single point grounding from grounding terminal and do not wire across the grounding terminal.

*Specifications are subject to change without prior notice



