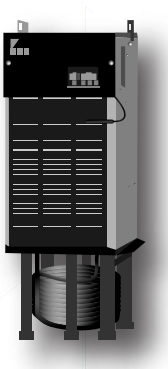
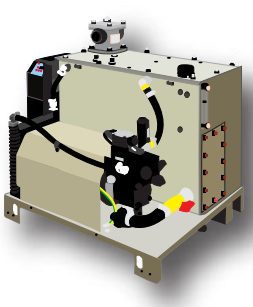
Hybrid Hydraulic Systems

DAIKIN

Hydraulics Solutions
for the Future of Industry





ALL WORLD
MACHINERY SUPPLY

This catalog was created with support from Daikin Industries, Ltd. specifically for the North American oil hydraulics market.

All contents in this catalog are subject to change for improvement without prior notice.

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ALL WORLD
MACHINERY SUPPLY

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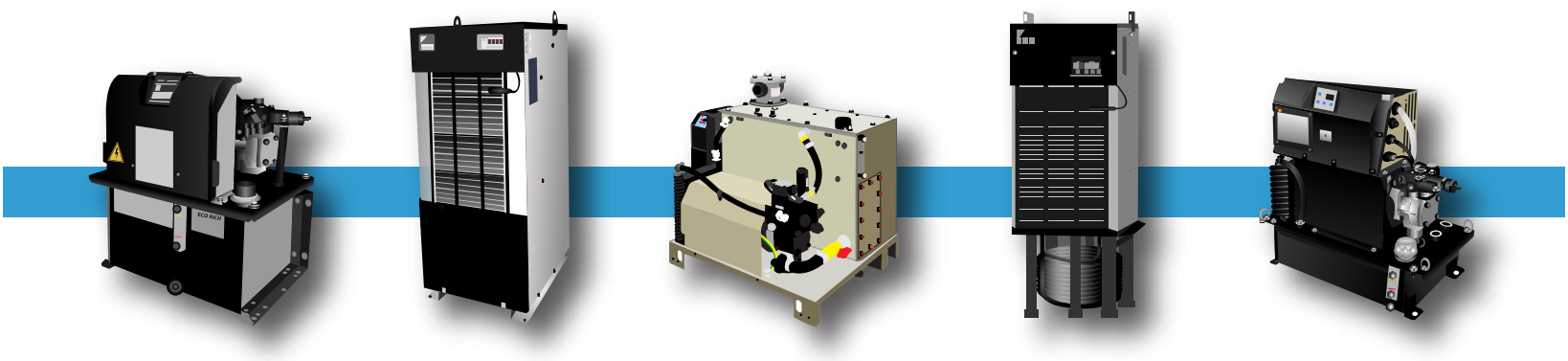


EHU

HYB WIN

EHU (2017)

HYB WIN | 16 PQ | A | C

EHU-R

HYB WIN | 16 PQ | A | C

SPECIFICATIONS		EHU14-L04-A-30	EHU25-L04-A-30	EHU25-L07-AE-30	EHU25M07-AE-30	EHU30-M07-AE-30	EHU1404-40	EHU2504-40	EHU2507-40	EHU3007-40	EHU15R-M0701	EHU15R-M0702	EHU30R-M0701	EHU30R-M0702	EHU40R-M07-A01	SUT00S4007-30
Metric	Rated Capacity	0.75 kW	1.5 kW	2.2 kW	2.8 kW	2.8 kW	0.75 kW	1.5 kW	2.2 kW	2.8 kW	2.2 kW	2.2 kW	2.8 kW	2.8 kW	3.7 kW	
	Max Operating Pressure	4.0 MPa	4.0 MPa	7.0 MPa	7.0 MPa	6.0 MPa	4.0 MPa	4.0 MPa	7.0 MPa	7.0 MPa	7.0 MPa	7.0 MPa	7.0 MPa	7.0 MPa	7.0 MPa	
	Max Flow Rate	14 L/min	25 L/min	25 L/min	25 L/min	28.5 L/min	15L/min	25 L/min	25 L/min	28.5 L/min	15 L/min	28.5 L/min	28.5 L/min	28.5 L/min	40 L/min	
	Tank Capacity	10 L	10 L	10 L	10 L	10 L	18 L	18 L	18 L	18 L	10 L	20 L	10 L	20 L	30 L	
Imperial	Max Operating Pressure	580 PSI	580 PSI	1015 PSI	1015 PSI	870 PSI	580 PSI	580 PSI	1015 PSI	1015 PSI	1015 PSI	1015 PSI	1015 PSI	1015 PSI	1015 PSI	
	Max Flow Rate	3.7 G/min	6.6 G/min	6.6 G/min	6.6 G/min	6.6 G/min	4.0 G/min	6.6 G/min	6.6 G/min	6.6 G/min	4.0 G/min	6.6 G/min	6.6 G/min	6.6 G/min	10.6 G/min	
	Tank Capacity	2.6 G	2.6 G	2.6 G	2.6 G	2.6 G	4.7 G	4.7 G	4.7 G	4.7 G	2.6 G	5.3 G	2.6 G	5.3 G	7.9 G	
Model Without Tank																*

16 PQ — 16 Pattern PQ Control

HYB WIN — Hybrid-Win Supported

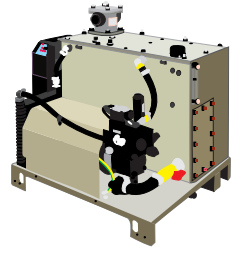
C — Communication Function

A — Analog Command Input
*Only applies to a single pump

CE Approved

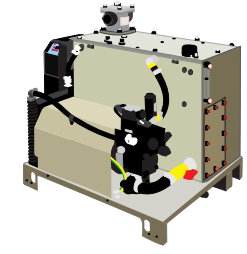
IE4 Certified

SUT (Single Pump)



HYB WIN | 16 PQ | A | C

SUT (Double Pump)



HYB WIN | 16 PQ | C

SPECIFICATIONS		SUT03S1507-30	SUT00S1507-30	SUT03S3007-30	SUT00S3007-30	SUT03S1510-30	SUT00S1510-30	SUT03S4007-30	SUT00S4007-30	SUT03S3010-30	SUT00S3010-30	SUT03S1516-30	SUT00S1516-30	SUT06S3016-30	SUT00S3016-30	SUT06S6007-30	SUT00S6007-30	SUT10S8007-30	SUT00S8007-30	SUT00S11007-30	SUT06D4016-30	SUT00D4016-30	SUT06D6021-30	SUT10D6021-30	SUT00D6021-30	SUT10D8021-30	SUT16D8021-30	SUT00D8021-30	P-SUT20D11KW-30	SUT00D11021-30
Metric	Rated Capacity	2.2 kW		2.8 kW		2.8 kW		3.7 kW		3.7 kW		3.7 kW		5.0 kW		5.0 kW		7.0 kW		11.0 kW	3.7 kW		5.0 kW			7.0 kW			11.0 kW	
	Max Operating Pressure	7.0 MPa		7.0 MPa		10.0 MPa		7.0 MPa		10.0 MPa		16.0 MPa		16.0 MPa		7.0 MPa		7.0 MPa		7.0 MPa	15.7 MPa		20.6 MPa			20.6 MPa			20.6 Mpa	
	Max Flow Rate	15 L/min		28.5 L/min		15 L/min		40 L/min		28.5 L/min		15 L/min		28.5 L/min		60 L/min		80 L/min		110 L/min	40 L/min		60 L/min			80 L/min			110 L/min	
	Tank Capacity	30 L		30 L		30 L		30 L		30 L		30 L		60 L		60 L		100 L		-	60-160 L		100 L			160 L			200 L	
Imperial	Max Operating Pressure	1015 PSI		1015 PSI		1450 PSI		1015 PSI		1450 PSI		2320 PSI		2320 PSI		1015 PSI		1015 PSI		1015 PSI	2277 PSI		2987 PSI			2987 PSI			2987 PSI	
	Max Flow Rate	3.9 G/min		6.6 G/min		3.9 G/min		10.5 G/min		6.6 G/min		3.9 G/min		6.6 G/min		15.8 G/min		20.1 G/min		29.0 G/min	10.5 G/min		15.8 G.min			20.1 G/min			29 G/min	
	Tank Capacity	7.9 G		7.9 G		7.9 G		7.9 G		7.9 G		7.9 G		15.8 G		15.8 G		26.4 G		-	26 G		26 G			26 G			52 G	
Model Without Tank			*		*		*		*		*		*		*		*		*	*		*			*				*	

16 PQ — 16 Pattern PQ Control

HYB WIN — Hybrid-Win Supported

C — Communication Function

A — Analog Command Input
*Only applies to a single pump

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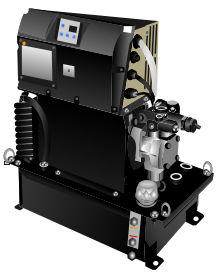
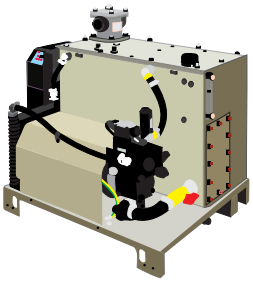
HYBRID HYDRAULIC SERIES

EHU

EHU
2017



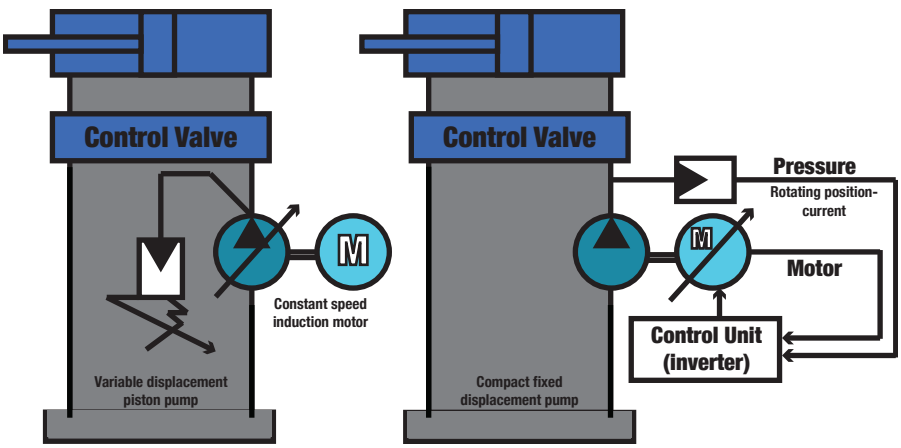
EHU-R



SUT

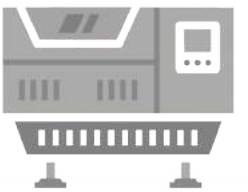
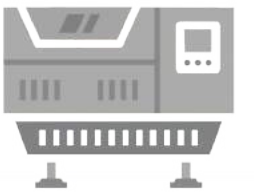
ONE ORIGINAL
MANY IMITATORS

Many have tried to match Daikin's unique hybrid power unit design, but none have succeeded in price, efficiency, and interchangeability. The Daikin Hybrid Power Unit series realized the world's first fusion of hydraulics technology with Daikin's exceptional air conditioning motor/inverter technology, and has been a trend setter for energy savings in the hydraulics field. Daikin's hybrid hydraulic series has now undergone a model change involving incorporating a highly efficient IPM motors in place of the SR motor. The significant improvement in energy savings and low heat generation contribute to greater plant energy savings. With a rare-earth permanent magnet deeply embedded in the rotor, the IPM motor uses an electromagnetic structure that maximizes magnetic torque (attractive & repulsive force between the coil and permanent magnet) and reluctance torque (force of the coil that attracts iron). This structure achieves high torque and maximum efficiency while suppressing heat generation. Combining two rotational forces, "magnetic torque" generated by a powerful neodymium magnet and "reluctance torque," generates more power with less electricity.



*Conventional Unit vs. Daikin Inverter Unit

On a standard machining center or lathe, hydraulics consume 20-30% of the entire machine center's energy consumption. The heat generation and tank dump waste of hydraulic units greatly contribute to the excessive operational costs and performance issues that continue to trouble users. Through their unique design, Daikin Hybrid Hydraulic Power Units provides five major factors that put money back into the pockets of manufacturing companies faced with the costs of daily operations. Ultimately this reduction in energy, heat, oil, noise, and stock creates instant cost savings; enough that the units can pay for itself in as little as 12 months of operation.

ENERGY Lower energy consumption through advanced inverter technology provides longer unit life, reduced energy cost, and sustainable savings. Average reduction of 60-70%.

HEAT A reduction of heat generation creates longer life for machine components and reduces ambient workspace temperatures, resulting in reduced air conditioning demand and fewer opportunities for overheating. Average reduction from 104°F to 70°F.

OIL Conventional hydraulic units require larger capacity tanks to dissipate heat than Daikin power units, which reduce oil disposal. Average reduction of 33-80%.

NOISE Noise reduction creates a more comfortable and safe work environment, reducing worry and cutting cost on factory alarms. Average reduction from 75 dBA to 50 dBA.

STOCK Compatibility and adaptability creates less need for on-hand stock, as Daikin power units work as a drop-in replacement for the vast majority of hydraulic pumps and motors within the industrial marketplace.

POWER UNIT
ENERGY CONSUMPTION

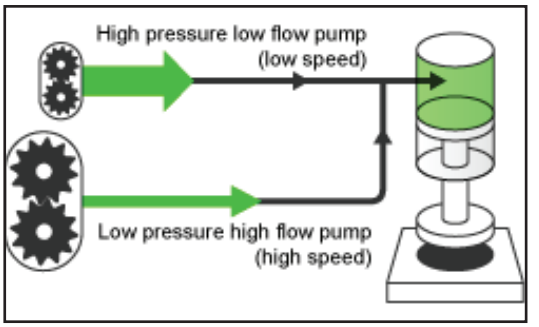
Reviewing energy saving options in machining facilities is crucial to protect environment and improve productivity. On a standard production line, up to 50% of all power consumed comes from the processing portion of the operation. This is the highest of all power consumer factors a product line faces.

OTHER	AIR CONDITIONING 14%	COMPRESSING 14%	ASSEMBLING 14%
PROCESSING 50%			

Whereas most companies identify opportunities to improve productivity, reduce waste, and save energy through updates around their plant, not many focus on the actual production cycle of their machines. Daikin Industries Ltd. has chosen to focus on the process lines in a factory where 45% energy is generally consumed. Most of the fixed consumption consists of the hydraulic unit, oil cooling, and coolant pump. Daikin's unique oil hydraulic systems, which seamlessly integrates oil hydraulic control and inverter motor technologies, are able to reduce power consumption significantly. This advanced, specially-designed motor is patented and manufactured by Daikin Industries and is found in no other power unit available. A rare-earth permanent magnet deeply positioned in the rotor can generate magnet torque (attraction & repellence between coil and permanent magnet) and reluctance torque (coil attracts iron). This electromagnetic structure attains high torque, highest efficiency, and low heat generation.

Daikin hydraulic systems also feature an autonomous select fixed double pump to achieve great energy savings. Flow combining/dividing selection can be independently controlled according to load pressure with a fixed displacement double pump (high and low) and selector. If high speed is needed, two high and low displacement pumps are combined to rotate at high speed to discharge at a higher flow rate. When the pressure is retained, only the low-displacement pump is selected to operate at low speed to achieve energy-savings and a much lower heat to noise ratio. By monitoring pressure of each control axis from three to six, the high speed motor can also provide an idle stop function. Many of Daikin's direct competitors create energy savings by a complete shut-off of their system when not in use. This creates serious wear and tear over a period of time and can often be more inefficient when the machine it is installed into runs continuously. This idling function ensures maximum energy-savings by slowing the motor automatically when the required output pressure is obtained, retaining just enough pressure for the system to kick back into use when next called upon.

Complete idling is also available by giving simple DC 24V signal to the power unit. Controller stays on during idle stop so to prevent damage to the electrical circuit from repeated force shut-off.



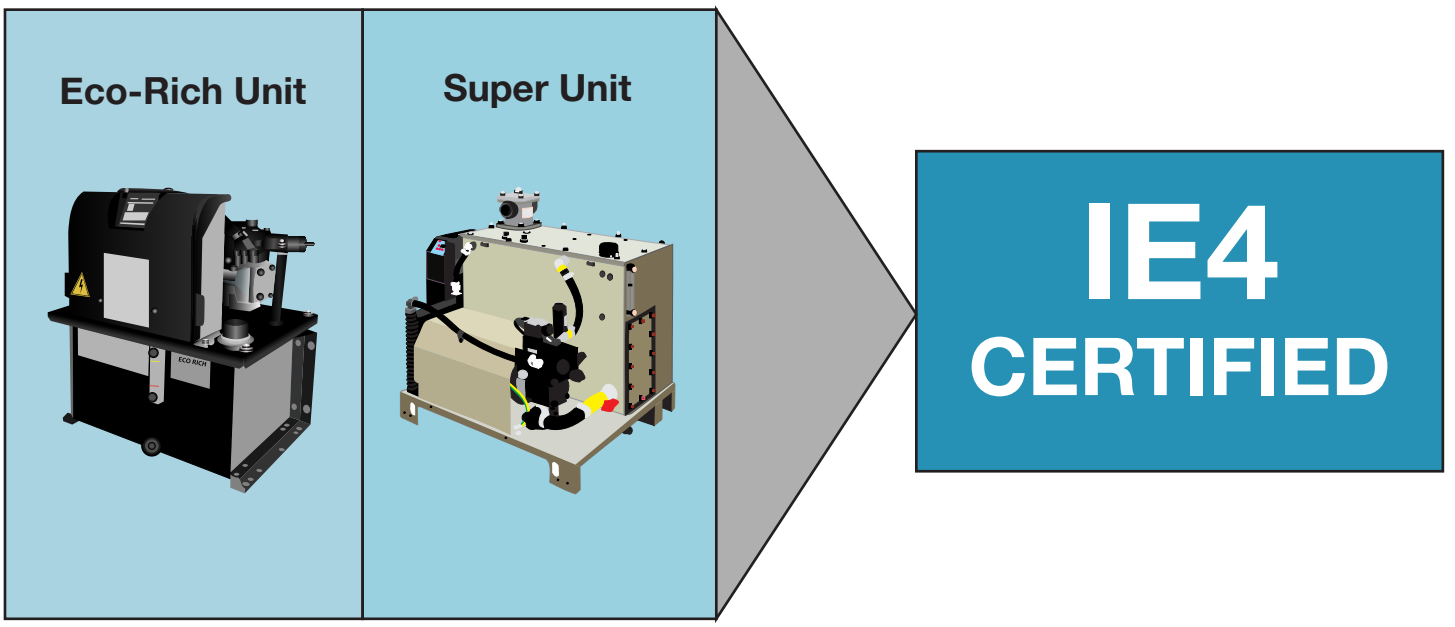
In 2009, IE2 (high efficiency) standards were introduced to the United States. The same laws came into effect in Europe and China in 2013. Today, all countries have introduced IE3 (premium efficiency) standards which regulates efficiency of motors in the power range of 0.75kW and above.

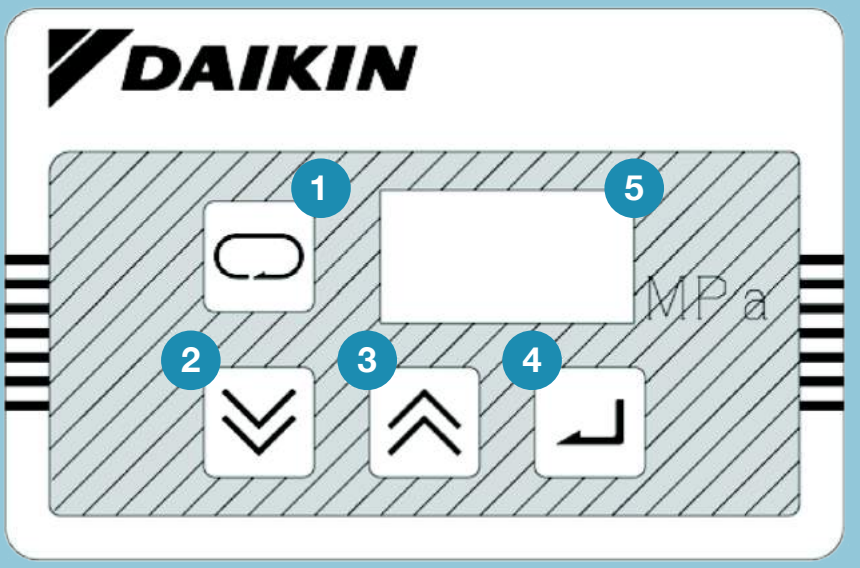
The IE-code and its efficiency levels create a basic vocabulary for governments to determine the efficiency level for their Minimum Energy Performance Standards (MEPS). The European Union set motor MEPS levels (Directive 640/2009) at IE3 (or IE2 in combination with a variable frequency drive) in 2015 for smaller motors and in 2017 covering larger motors. In 1997 (Energy Policy Act) the minimum required level was set at the equivalent of IE2. In 2007 (Energy Independence and Security Act) MEPS were raised to the equivalent of the IE3 level (NEMA Premium). NEMA Premium and IE3 are coordinated as efficiency levels, the USA currently recognizes in its legal requirements the national testing standard IEEE 112B and the Canadian test standard CSA390 but not yet the IEC test Standard IEC 60034-2-1 (the differences are minimal). Therefore most motors used on machines need to be IE3 level.

IE4 SUPER PREMIUM EFFICIENCY
IE3 PREMIUM EFFICIENCY
IE2 HIGH EFFICIENCY
IE1 STANDARD EFFICIENCY

Even today, with the IE3 regulations in place, there are hydraulic companies that are producing motors that are not compliant by law. If you're looking to upgrade your motor, you can rest assured knowing that Daikin Hybrid Hydraulics Power Units meet and exceed these standards.

Daikin Hybrid Hydraulics embody the most innovative and adaptable technology available today and provide users with options that provide savings far beyond what conventional units can offer.

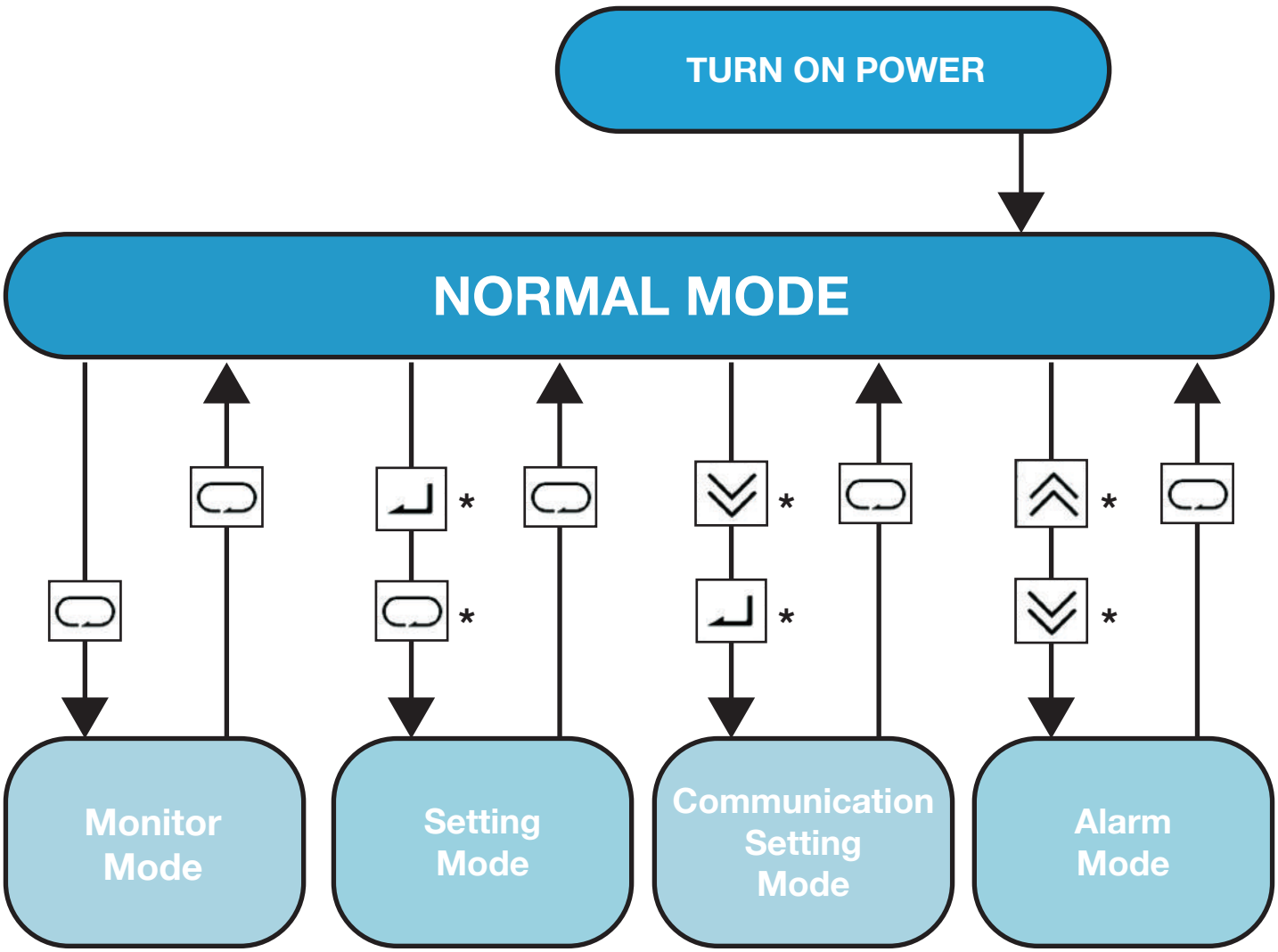




NO.	ITEM	DESCRIPTION
1	**[MODE] key**	Selects the operation mode.
2	**[DOWN] key**	Decrements a value set for the operation mode/monitor mode/data.
3	**[UP] key**	Increments a value set for the operation mode/monitor more/data.
4	**[ENT] key**	Confirms the edited operation mode/monitor mode/data.
5	**Data Display**	Normal mode: Displays the actual pressure or alarm code. Monitor mode: Displays the pressure switch setting, each pressure setting, each flow rate setting, the actual flow rate, or the actual rotation speed. Setting mode: Set or change the pressure, flow rate, or other parameters. Alarm mode: Check the alarm history. Communication setting mode: Change communication settings.

Daikin Hybrid Hydraulic Power Units are the only cost-effective units in the world that can be adjusted through an easy-to-use keypad design located on the front of the unit. The keypad serves a diagnostic tool that lets the user manually adjust pressure and flow settings on each machine for unparalleled efficiency.

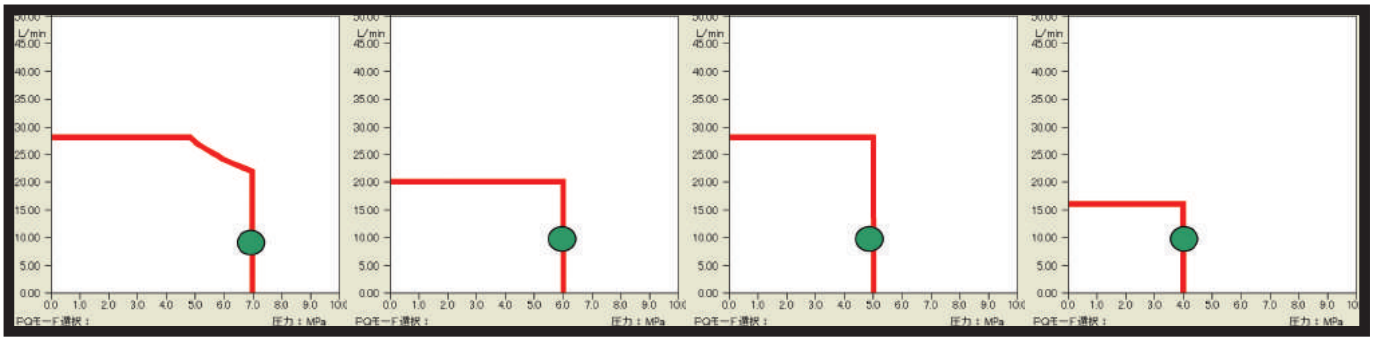
Previous and potential failures are easy to monitor through the use of the keypad as a diagnostic tool. The keypad monitors common (N) parameters and uses smart technology to alert the user of any problems or failures. The unit will even shut itself off if a catastrophic failure occurs, drastically reducing maintenance times.



16
PQ

MULTI-STAGE PRESSURE & FLOW RATE CONTROL (16 PQ)

The force (pressure) and speed (flow rate) of the actuator (cylinder) can be controlled with 16 pressure (P) and flow rate (Q) setting patterns. Pressure control valves and proportional flow control valves, which are utilized in conventional actuator circuits, are not required. Once the pressure and flow rate have been set at the controller's operation panel, you can select 16 preset patterns using external input signals. Daikin Hybrid Hydraulic Power Units autonomously change the control mode from flow rate control to pressure control (example: flow rate control is changed to pressure control at the cylinder stroke end). The solenoid valve that actuates the cylinder must be turned ON/OFF at the machine. "Shockless control" is the result of smooth changing of force (pressure) and speed (flow rate). Once acceleration time and deceleration time parameters are registered, the force or speed can be changed gradually during a pressure/flow rate setting change.



C

COMMUNICATION FUNCTION

Hybrid hydraulics can be remotely controlled from PLC interface of your machine. This function eliminates complicated individual operations and installation space limitations. Enabling remote operation to change the operation conditions setting of the hybrid unit. Various settings such as acceleration & deceleration time and pressure switch settings, as well as the pressure and flow rate, can be set remotely. This makes it possible to control the hydraulic pressure operating conditions in synchrony with the control of the machine.

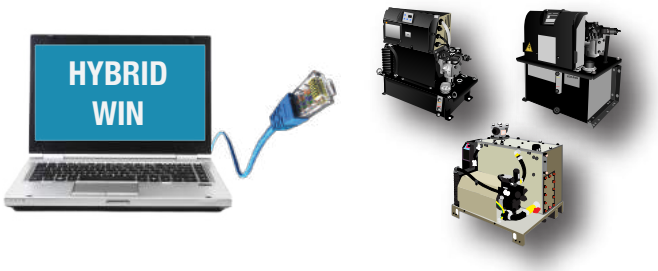
The capability to read the operating conditions of the hybrid units makes it possible to display information, such as the current pressure and flow rate on the screen, at the machine. A hydraulic control system for machinery that requires variable speed control or continuity of pressurizing forces can be realized with a simple configuration. A joystick or trimmer can be connected for real-time control (only for analog control models). The serial communication interface conforms to the RS232C standard (RS485 option available). Prepare a control unit such as a PLC or touch panel display with the RS232C communication function happens at the machine side.

HYB WIN

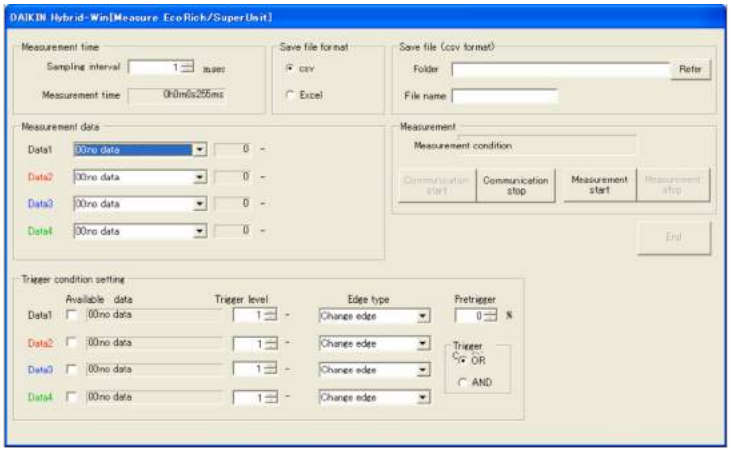
HYBRID-WIN PROGRAMMING

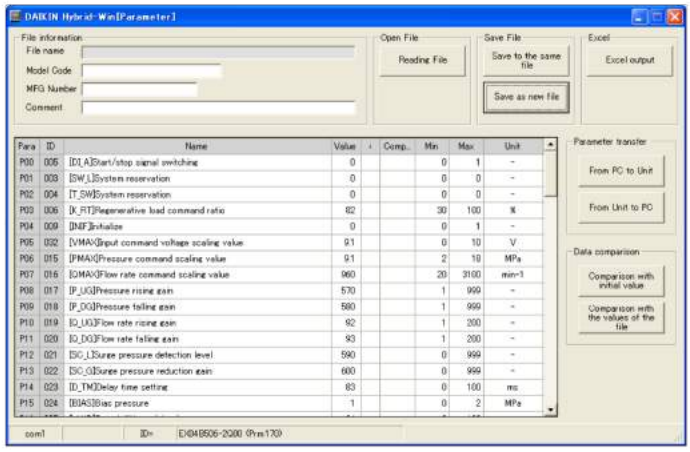
Hybrid-Win is utility software to monitor the internal status of Daikin hybrid systems using a PC. The software and its instruction manual can be downloaded from Daikin's website free of charge by completing the user registration process. This PC utility reads data from Daikin hybrid systems and manages it. Parameter setting and monitoring can be accomplished efficiently using the Windows application. Special cables are required.

The pressure, flow rate, and other internal data of the inverter controller are monitored and displayed in the form of graphs. This facilitates operation checks during test runs, adjustments of parameters, and troubleshooting.



The time required for set-up can be slashed by editing the parameter settings on the PC and writing them to the unit in a batch. The ability to read and save settings eases management. To speed up your readings, you can program the software to save the alarm history. This function enables quick identification of the parts that require maintenance and reduction of the downtime. The operating time display can serve as the guide for the timing to replace consumable parts or to conduct maintenance. Troubleshooting information including the diagnosis results of the cause of an alarm and action to take can be displayed.





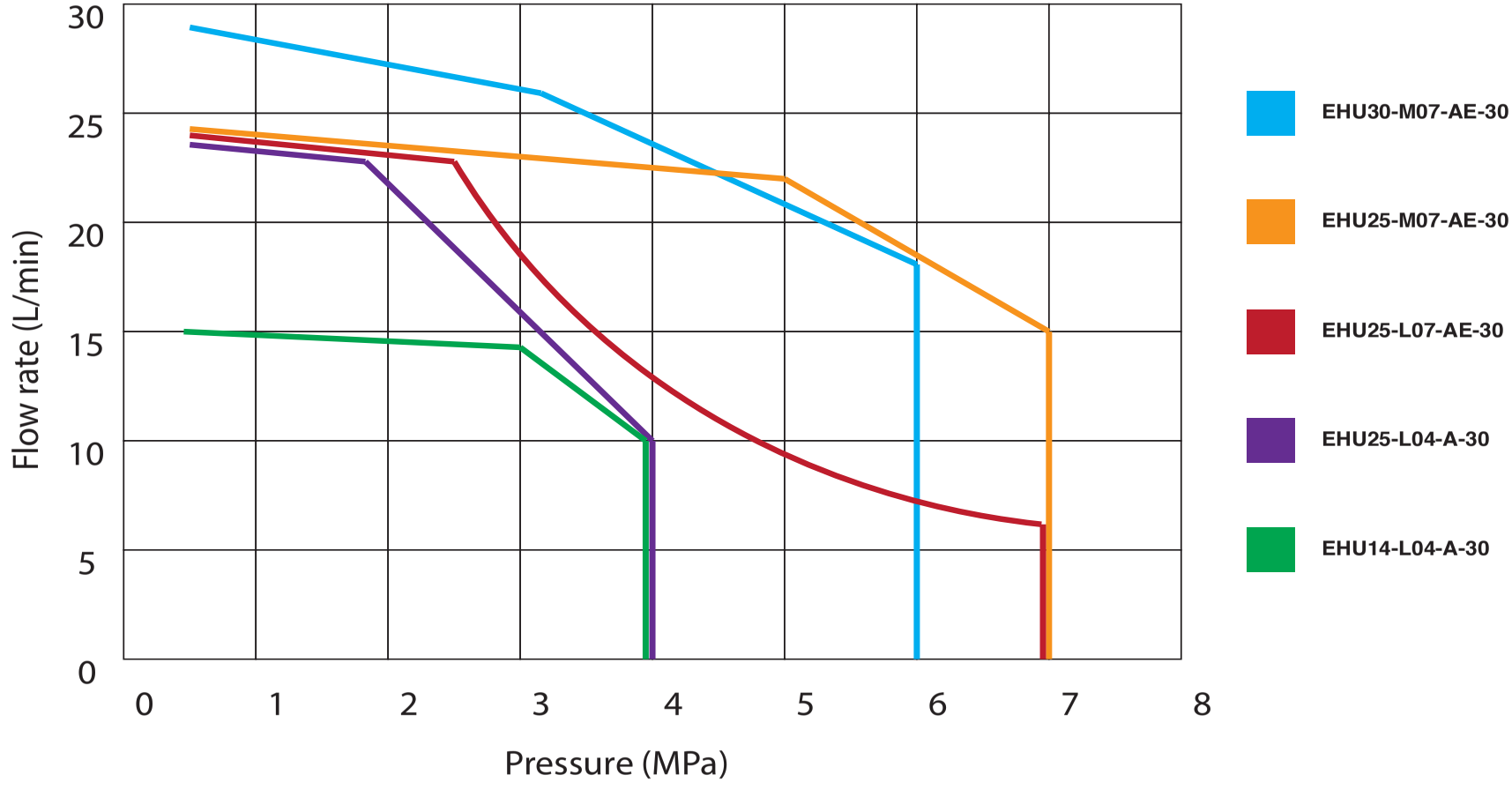
A

ANALOG COMMAND INPUT

The capability to specify the pressure and flow rate with voltage ranging from 0 to 10 V enables continuous hydraulic control as required. Real-time variation in response to commands facilitates condition settings at the machine side. A hydraulic control system for machinery that requires variable speed control or continuity of pressurizing forces can be realized with a simple configuration. A joystick or trimmer can be connected for real-time control.

EHU	-	**	-	*	-	**	-	*	-	*	-	**	-	***
1		2		3		4		5		6		7		8

1. **Basic** - EHU: Eco-Rich EHU Series
2. **Pump Max Flow Rate** - 14: 14 L/min
   25: 25 L/min
   30: 28.5 L/min
3. **Output Characteristic** - L: For Lathes
   M: For Machining Centers
4. **Max Operating Pressure** - 04: 4.0 MPa
   07: 7.0 MPa
5. **Control System** - A: Pressure Control System
6. **Specs of Control Unit** - No Symbol : With Reactor
   (In case of EHU14 (25)-L04)
   E: With Reactor
   (In case of EHU25-L07, M07, EHU30-M07)
7. **Design #** - 10: EHU40R-M07
   *May change according to model changes.
8. **Non-standard #** - Non-standard No.
   No symbol: Standard



Eco-Rich (EHU)

Model		EHU14-L04	EHU25-L04	EHU25-L07	EHU25-M07	EHU30-M07
Tank Capacity (gal)		2.4 (10 L)				
Motor Capacity (Nominal)		Equivalent to 0.75kW		Equivalent to 2.2kW	Equivalent to 2.8kW	
Max Operating Pressure (PSI)		580 (4.0 MPa)		1000 (7.0 MPa)		870 (6.0 MPa)
Pressure Adj. Range (PSI)		218 - 580 (1.5 - 3.5 MPa)		1.5 - 7.0 (218 - 1000 MPa)		1.5 - 6.0 (218 - 870 MPa)
Discharge Rate Adj. Range (gal/min)		1 - 3.7 (4 - 14 L)	1.3 - 6.6 (5 - 25 L)			1.3 - 7.5 (5 - 28.5 L)
Weight (lbs.)		95 (43 kg)		99 (45 kg)	101 (46 kg)	
Capacity of Fan Oil for Oil Cooler		16/15W (50/60 Hz)				
Power Supply	Motor From Pump	3-phase 200/200-220V AC, 50/60Hz Allowable Power Function +10%				
	Oil Cooler Fan Motor	2-phases 200/200-220V AC, 50/60/60H (supported by the controller)				
Alarm Output Relay		DC 12/24 V AC 100V (50/60Hz) Max Load Current: Below 1A (resistance lead)				
Standard Painted Color		Black				
Usable Oil		Mineral oil based special hydraulic fluid/abrasion resisting hydraulic fluid For recommended brands: refer to Daikin's "Hydraulic Equipment General Catalog (HK196A) Viscosity grade: ISO VG32 - 68 Viscosity range: 15 - 400mm²/s (20-200 mm²/s recommended) Contamination: Class NAS9 or lower				
Tank Oil Temperature		32 - 140°F (Recommended: 59 - 122°F) / 0 - 60°C (Recommended: 15 - 50 °C)				
Ambient Temperature		95°F / 0 - 35°C				
Ambient Humidity		85% RH or lower				
Installation Place		Indoors (fix with bolts without failure)				
Others		The no-fuse breaker and an earth leakage breaker must be used				
Notes:		1. The pressure is preset to max pressure when delivered. 2. It is preset to be the max discharge rate when delivered (the max discharge rate is a theoretical value but not an exact one). 3. Other fluid (example: water and glycol) than mineral oil base hydraulic fluid (hydrous or synthetic) cannot be used.				

EHU	-	**	-	**	-	40	-	*	-	******
1		2		3		4		5		6

1 **Basic** - EHU: Eco-Rich EHU Series

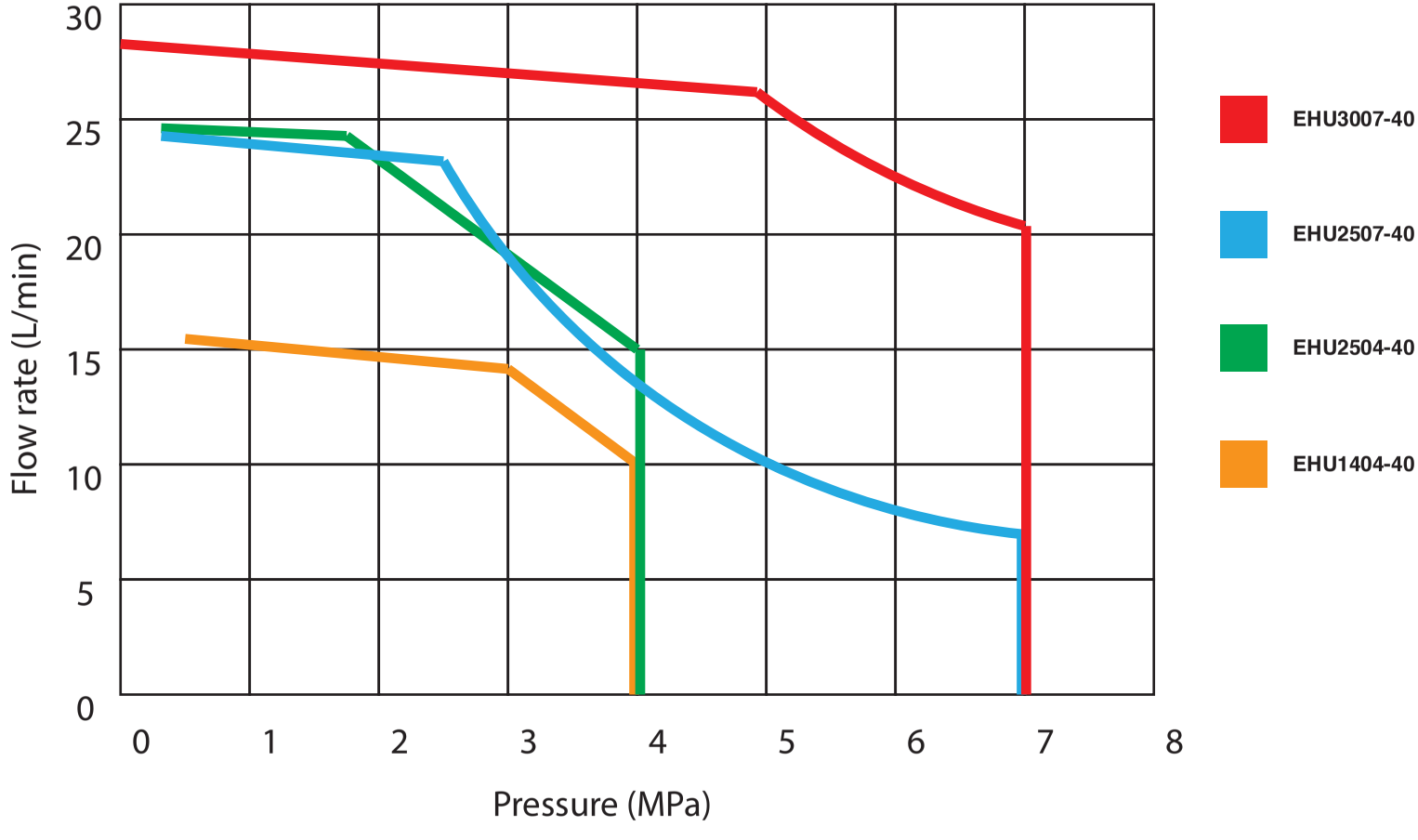
2 **Pump Max Flow Rate** - 14: 14 L/min
25: 25 L/min
30: 28 L/min

3 **Max Operating Pressure** - 04: 4.0 MPa
07: 7.0 MPa

4 **Design No.** - Design 40 series

5 **Controller Options** - C: With RS4SS/485 communications function
S: With separated power supplies for power and control lines
N: No controller option and with unit options (in alphabetical order when combined)

6 **Specs of Control Unit** - Unit Combination Options, In Alphabetical Order When Combined



Eco-Rich (EHU)

New 2017 Model

Model		EHU1404-40	EHU2504-40	EHU2507-40	EHU3007-40
Tank Capacity (gal)		4.7 (18 L)			
Motor Capacity (Nominal)		0.75kW	1.5kW	2.2kW	2.8kW
Max Operating Pressure (PSI)		580 (4.0 MPa)		1000 (7.0 MPa)	
Pressure Adj. Range (PSI)		218 - 580 (1.5 - 4 MPa)		1.5 - 7.0 (218 - 1000 MPa)	
Discharge Rate Adj. Range (gal/min)		1 - 3.7 (4 - 14 L)	1.3 - 6.6 (5 - 25 L)		
Weight (lbs.)		95 (43 kg)		99 (45 kg)	101 (46 kg)
Capacity of Fan Oil for Oil Cooler		16/15W (50/60 Hz)			
Power Supply		3-phase AC 200V (50Hz), 200V (60Hz), 220 V (60Hz) (Permissable voltage fluctuation ‡10%)			
External Input Signal		3 channels, photo coupler insulation, DC 24 V, (maximum of DC 27 V), 5 mA per channel			
External Output Signal	Digital Output	1 channel, photo coupler insulation, open collector output, DC 24 V, 50 mA maximum per channel			
	Contact Output	1 channel, relay output, contact capacity: DC 30 V, 1 A (resistance load), 1 common contact			
Rated Current	200 V/50 Hz (A)	6.0	7.0	4.7	10.3
	200 V/60 Hz (A)	5.9	7.0	4.5	10.3
	220 V/60 Hz (A)	5.5	6.7	4.3	9.7
No Fuse Breaker Capacity (A)		15			
Mass (hydraulic oil excluded) (lbs)		57 (26 kg)		64 (29 kg)	
Standard Coating Color		Black			
Usable Oil		Mineral oil based hydraulic oil/wear resistant hydraulic fluid Viscosity grade: ISO VG32 - 68 Viscosity range: 15 - 400mm²/s (20-00 mm²/s recommended) Contamination: Within NAS Class 10			
Tank Oil Temperature		32 - 140°F (Recommended: 59 - 122°F) / 0 - 60°C (Recommended: 15 - 50 °C)			
Operating Ambient Temperature		32-104°F (-20 to 40°C)			
Humidity		85% RH max (no condensation)			
Installation Place		Indoors (fix with bolts)			
Notes:		1. The pressure is preset to max pressure when delivered. 2. It is preset to be the max discharge rate when delivered (the max discharge rate is a theoretical value but not an exact one). 3. Other fluid (example: water and glycol) than mineral oil base hydraulic fluid (hydrous or synthetic) cannot be used.			

EHU	**	R	-	M	**	**	*	*	-	**	-	***
1	2	1		3		4	5	6		7		8

1 **Basic** - EHU**R: Eco-Rich R (IPM installed)

2 **Pump Max Flow Rate** - 15: 15.2 L/min
30: 28.5 L/min

3 **Max Operating Pressure** - 07: 7.0 MPa

4 **Tank Capacity** - 01: 10 L
02: 20 L

5 **Hardware Option -** No symbol: Standard
B: With Terminal Box

6 **Function Option -** No Symbol: Multi-step pressure / flow rate control function, 4-pattern pressure
T: Flow rate control

7 **Design # -** May change according to model change.

8 **Non-Standard Graduated No.**

EHU	**	R	-	M	**	A	-	**	-	***
1	2	1		3		4		5		6

1 **Basic** - EHU**R: Eco-Rich R (IPM installed)

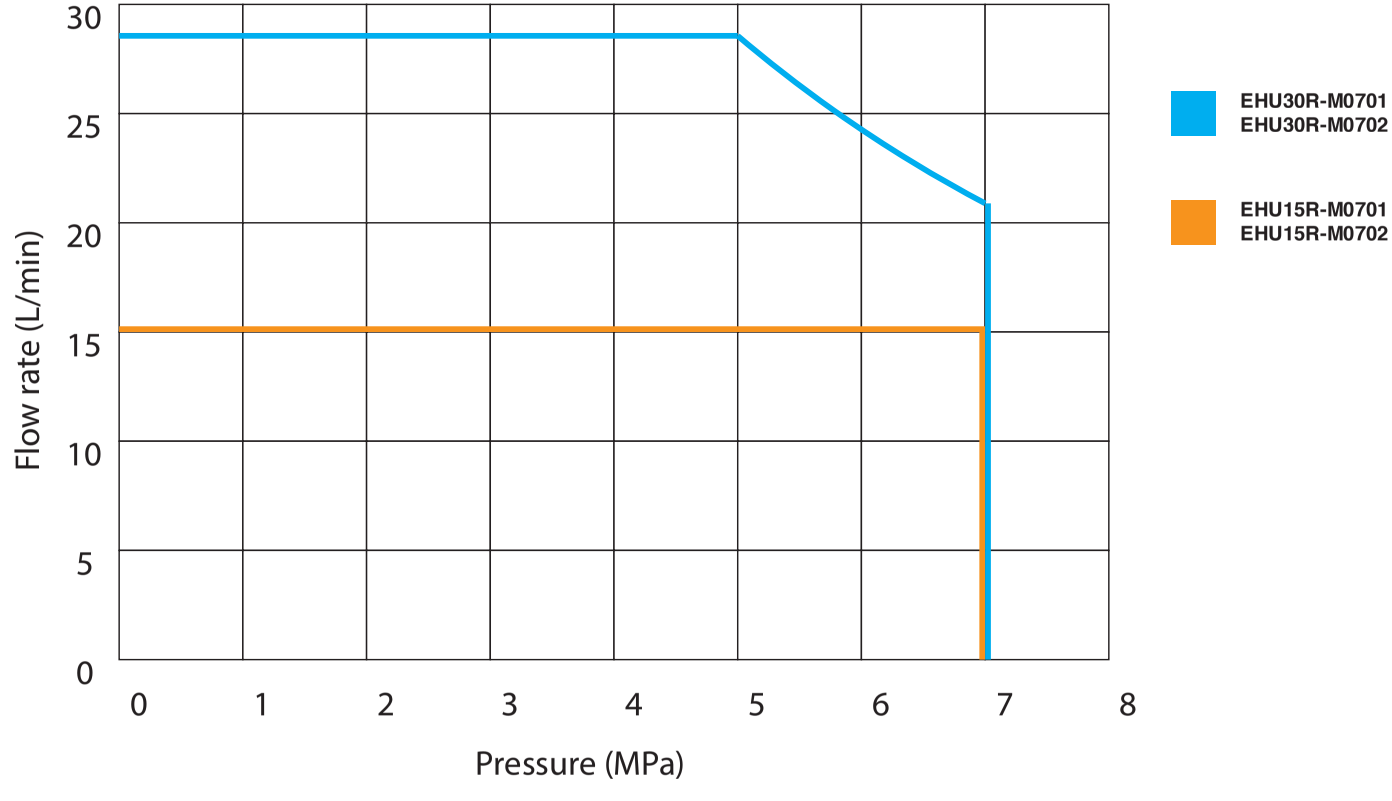
2 **Pump Max Flow Rate** - 40: 40 L/min

3 **Max Operating Pressure** - M07: 7.0 MPa

4 **Control Mode** - A: Pressure compensation control

5 **Design #: -** May change according to model change

6 **Non-Standard Graduation No.**



Eco-Rich (EHU-R)

Model		EHU15R-M0701	EHU15R-M0702	M30R-M0701	EHU30R-M0702	EHU40R-M07-A
Tank Capacity (gal)		2.4 (10 L)	5.3 (10 L)	2.4 (10 L)	5.3 (10 L)	7.9 (10 L)
Motor Capacity (Nominal)		Equivalent to 2.2kW		Equivalent to 2.8kW	Equivalent to 3.7kW	
Max Operating Pressure (PSI)		1000 (7.0 MPa)				
Pressure Adj. Range (PSI)		73 - 1000 (0.5 - 7.0 MPa)				218 - 1000 (1.5 - 7.0 MPa)
Discharge Rate Adj. Range (gal/min)		0.7 - 4.0 (2.5 - 15.2 L)		0.34 - 7.5 (3.5 - 28.5 L)		1.4 - 10.6 (5.3 - 40.0 L)
Weight (lbs.)		86 (39 kg)	88 (40 kg)	90 (41 kg)	93 (42 kg)	150 (68 kg)
Power Supply	Motor From Pump	3-phase 200/200-220V AC, 50/60Hz Allowable Power Fluctuation +10%				
	AC Fan Motor	1-phase 200/200-220V AC, 50/60/60Hz (supported by the controller)				
External Input Signal		3 points, Photocoupler insulation, DC 24V (Max 27V) 5mA Max/1ch				
External Output Signal	Digital Output (2 ch)	Photo coupler insulation, open collector output, DC 24V 50 mA Max/ 1 ch				
	Point of Contact Output (1 ch)	Relay output: Contact capacity 30V DC, 0.5A (Resistance load) 1ch contact				
Rated Current	200V/50Hz	7.9A		10.9A		11.2A
	200V/60Hz	7.7A		10.7A		10.9A
	220V/60Hz	7.1A		9.7A		10.0A
Alarm Output Relay		DC 12/24 V AC 100V (50/60Hz) The Max, Load Current: Below 1A (resistance lead)				
Standard Painted Color		Black				
Usable Oil		Mineral oil based special hydraulic fluid/abrasion resisting hydraulic fluid For recommended brands: refer to Daikin's "Hydraulic Equipment General Catalog (HK196A) Viscosity grade: ISO VG32 - 68 Viscosity range: 15 - 400mm²/s (20-200 mm²/s recommended) Contamination: Class NAS10 or lower				
Tank Oil Temperature		32 - 140°F (Recommended: 59 - 122°F) / 0 - 60°C (Recommended: 15 - 50 °C)				
Ambient Temperature		95°F / 0 - 35°C				
Ambient Humidity		85% RH or lower				
Installation Place		Indoors (fix with bolts without failure)				
Sea Level		1,000m or lower				

SUT	**	*	**	**	-	**	-	*	-	**	-	****
1	2	3	4	5		6		7		8		9

1 **Basic** - SUT: SUT Series

2 **Tank Capacities** - 00: Tankless
03: 30 L
06: 60 L
10: 100 L
16: 160 L

3 **Kind of Pump** - D: Tandem gear pump
S: Single gear pump

4 **Maximum Pump Discharge Rate** - 15: 15 L/min
30: 25 L/min
40: 40 L/min
60: 60 L/min
80: 80 L/min
110: 110 L/min

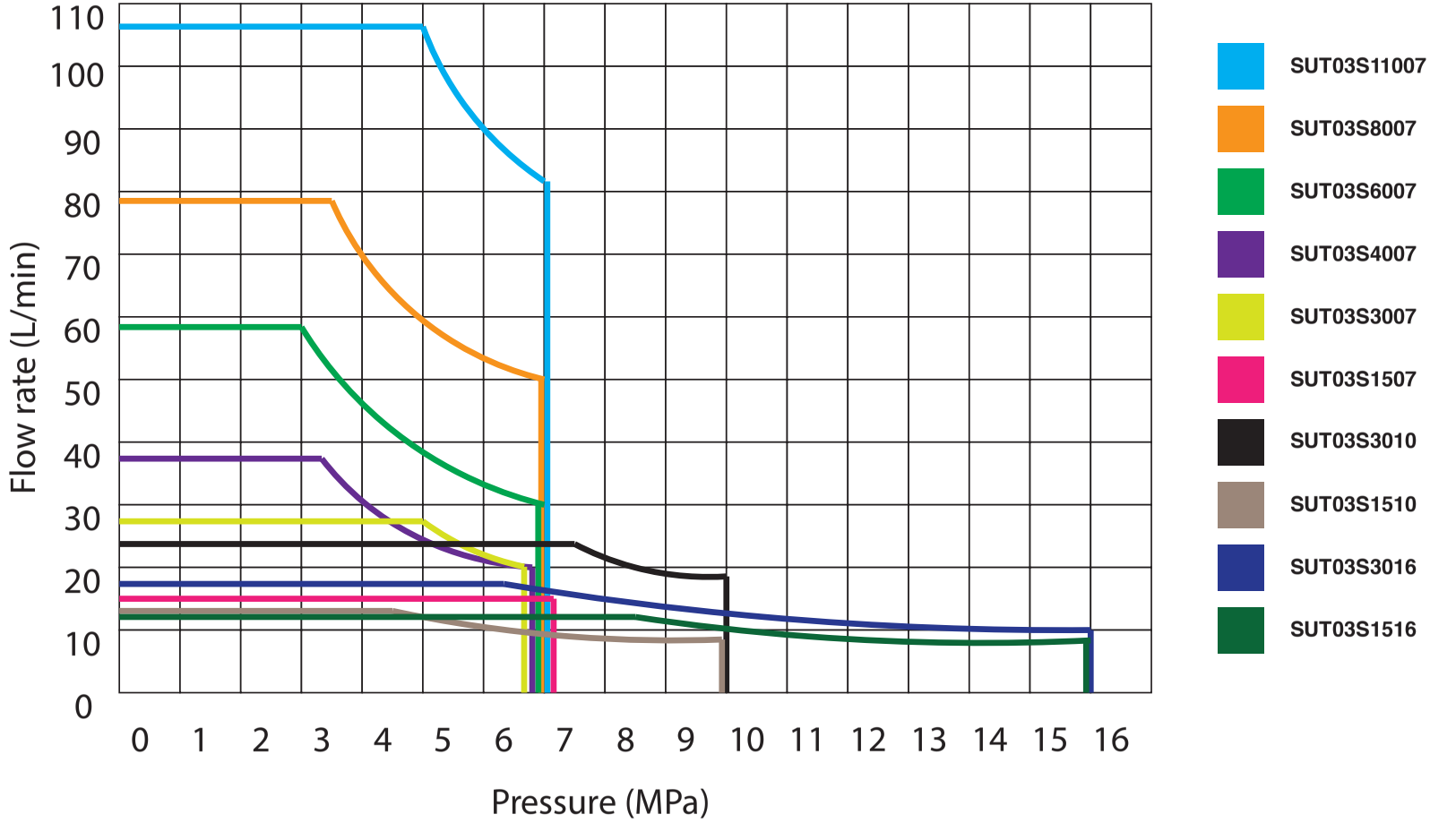
5 **Maximum Pressure** - 07: 0.7 MPa
10: 10.0 MPa
16: 15.7 MPa
21: 20.6 MPa

6 **Design #** - Number is progressed by model changes.

7 **Function Option** - No Symbol: No DC reactor, no noise filter
C: With communication function (RS232C)
P: With analog input function

8 **Hardware Option** - 01: Full Cover (except 30L tank)
02: Controller Cover (except for 7 kW)
03: DCL (except for 7kW)
04: Separate Power Supplies for Power & Control Systems
05: Water Fill Test Compliant Tank
06: Water Leak Test Compliant Tank
07: Level Switch
08: Temperature Switch
09: Thermometer
10: Micro Separator
11: Please Ask Specialist

9 **Non-standard No.** - No symbol: Standard
N***: Without Control System
A***: With Control System



Super Unit (SUT)

single pump

Model		SUT03S1507-30	SUT03S3007-30	SUT03S4007-30	SUT06S6007-30	SUT10S8007-30
Max Operating Pressure (PSI)		1000 (7.0 MPa)				
Operating Pressure Adjustment Range (PSI)		281 - 1015 (1.5 - 7.0 MPa)				
Maximum Flow Rate (gal)		4 (15.2 L)	7.5 (28.5 L)	10.5 (39.7 L)	16.1 (61.1 L)	21.9 (83.0 L)
Operating Flow Rate Range (gal)		0.7 - 4 (2.5 - 15.2 L)	0.9 - 7.5 (3.5 - 28.5 L)	1.4 - 10.5 (5.3 - 39.7 L)	2.3 - 16.1 (8.7 - 61.1 L)	3.1 - 21.9 (11.6 - 83.0 L)
Motor Capacity (Nominal)		2.2kW	2.8kW	3.7kW	5.0kW	7.0kW
Tank Capacity (gal)		7.9 (30 L)			15.6 (60 L)	26.4 (100 L)
Power Supply		3-phase 200 V (50 Hz) 200 V (60 Hz) 220 V (60Hz) (Permissable Power Fluctuation +10%) * Be sure to use a commercial power supply for the power source. The use od inverter power supply may cause burn damage to the unit.				
External Input Signal		5 channels, photo coupler insulation, DC 24V (Max 27 V) 5 mA Max/1ch				
External Output Signal	Digital Output	2 channels, photo coupler insulation, FET output, DC 24 V 50 mA max per channel				
	Contact Output	1 channel, relay output, contact capacity: 30 V DC, 0.5A (resistance load) 1 common contact				
Rated Current	200V/50Hz (A)	11.5	15.4	16.1	22.1	25.5
	200V/60Hz (A)	11.3	15.1	15.8	21.7	24.8
	220V/60Hz (A)	10.6	13.8	14.8	20.2	22.7
No-fuse breaker capacity (A)		15	20	20	30	50
Mass (hydraulic oil excluded) (lbs.)		130 (59 kg)	130 (59 kg)	141 (64 kg)	214 (97 kg)	289 (131 kg)
Standard Painted Color		Ivory White (Munsell code 5Y7.5/1)				
Usable Oil		Special mineral oil based special hydraulic oil/wear resistant hydraulic oil Viscosity grade: ISO VG32 to 68 Viscosity range: 15 - 400mm^2/s (20-200 mm^2/s recommended) Contamination: Within NAS class 9 (Class NAS10 or lower at 7MPa or less pressure). Volumetric water content: 0.1% max				
Tank Oil Temperature		32 - 140°F (Recommended: 59 - 122°F) / 0 - 60°C (Recommended: 15 - 50 °C)				
Operating Ambient Temperature		32 - 95°F / 0 - 40°C				
Ambient Humidity		85% RH maximum (no condensation)				
Installation Place		Indoors (fix with bolts without failure)				
Others		1. Be sure to connect a circuit breaker for all (three)poles and the earth leakage breaker. 2. Make sure that the electrical wiring meets the requirement of the European Standard EN60204-1 3. Be sure to connect the ground terminal.				

SUT	**	*	**	**	-	**	-	*	-	**	-	****
1	2	3	4	5		6		7		8		9

1 **Basic** - SUT: SUT Series

2 **Tank Capacities** - 00: Tankless
03: 30 L
06: 60 L
10: 100 L
16: 160 L

3 **Kind of Pump** - D: Tandem gear pump
S: Single gear pump

4 **Maximum Pump Discharge Rate** - 15: 15 L/min
30: 25 L/min
40: 40 L/min
60: 60 L/min
80: 80 L/min
110: 110 L/min

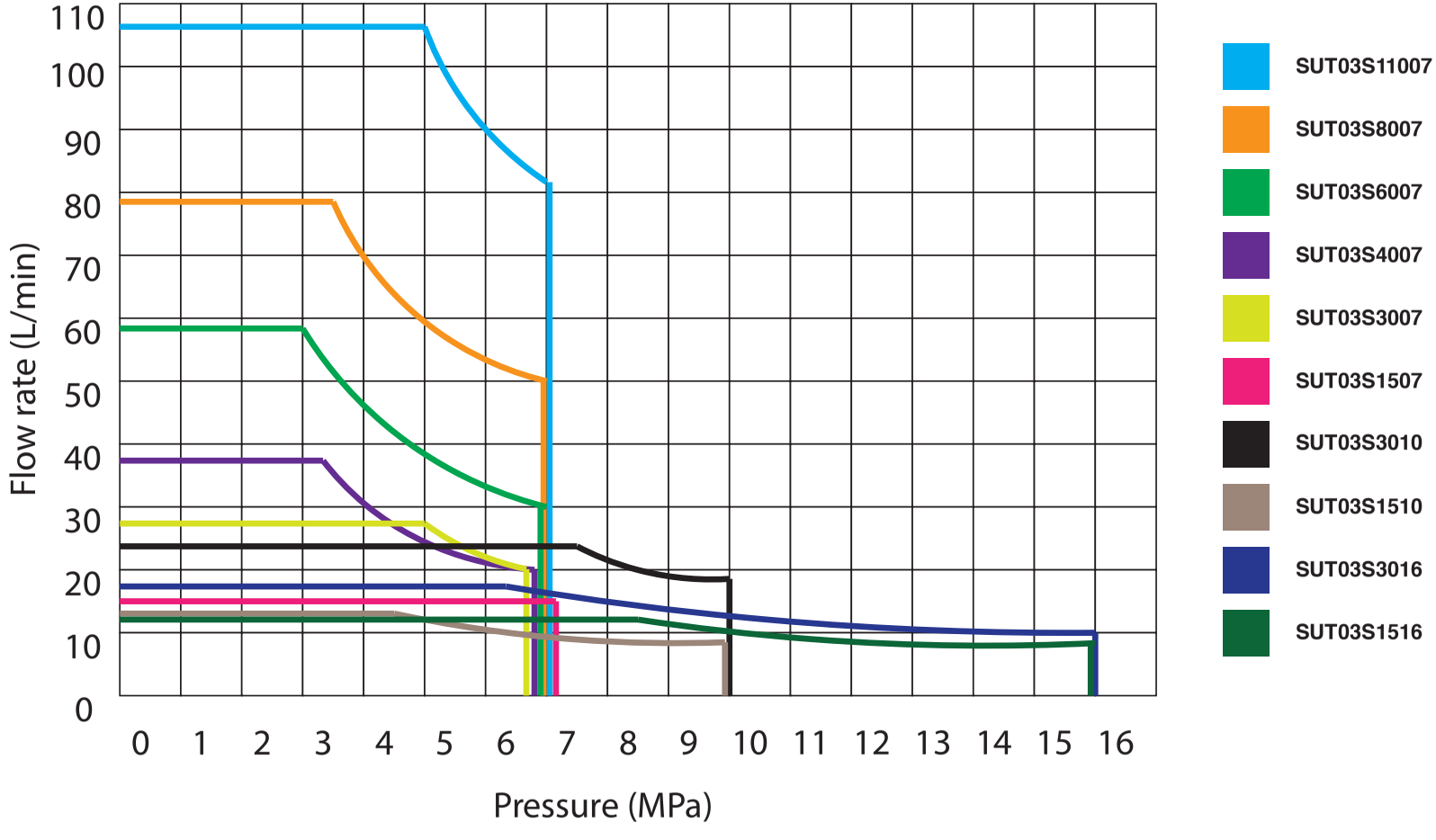
5 **Maximum Pressure** - 07: 0.7 MPa
10: 10.0 MPa
16: 15.7 MPa
21: 20.6 MPa

6 **Design #** - Number is progressed by model changes.

7 **Function Option** - No Symbol: No DC reactor, no noise filter
C: With communication function (RS232C)
P: With analog input function

8 **Hardware Option** - 01: Full Cover (except 30L tank)
02: Controller Cover (except for 7 kW)
03: DCL (except for 7kW)
04: Separate Power Supplies for Power & Control Systems
05: Water Fill Test Compliant Tank
06: Water Leak Test Compliant Tank
07: Level Switch
08: Temperature Switch
09: Thermometer
10: Micro Separator
11: Please Ask Specialist

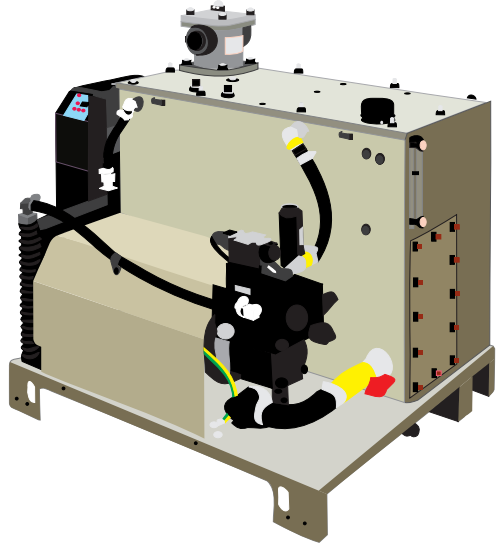
9 **Non-standard No.** - No symbol: Standard
N***: Without Control System
A***: With Control System



Super Unit (SUT)

single pump

Model		SUT03S1510-30	SUT03S3010-30	SUT03S1516-30	SUT06S3016-30
Max Operating Pressure (PSI)		1450 (10.0 MPa)		2321 (16.0 MPa)	
Operating Pressure Adjustment Range (PSI)		281 - 1450 (1.5 - 10.0 MPa)		281 - 2321 (1.5 - 16.0 MPa)	
Maximum Flow Rate (gal)		4 (15.2 L)	6.8 (25.6 L)	4 (15.2 L)	6.8 (25.6 L)
Operating Flow Rate Range (gal)		0.7 - 4 (2.5 - 15.2 L)	0.9 - 6.8 (3.4 - 25.6 L)	0.7 - 4 (2.4 - 15.2 L)	0.9 - 6.8 (3.4 - 25.6 L)
Motor Capacity (Nominal)		2.8kW	3.7kW		5.0kW
Tank Capacity (gal)		7.9 (30 L)			
Power Supply		3-phase 200 V (50 Hz) 200 V (60 Hz) 220 V (60Hz) (Permissable Power Fluctuation +10%) * Be sure to use a commercial power supply for the power source. The use od inverter power supply may cause burn damage to the unit.			
External Input Signal		5 channels, photo coupler insulation, DC 24V (Max 27 V) 5 mA Max/1ch			
External Output Signal	Digital Output	2 channels, photo coupler insulation, FET output, DC 24 V 50 mA max per channel			
	Contact Output	1 channel, relay output, contact capacity: 30 V DC, 0.5A (resistance load) 1 common contact			
Rated Current	200V/50Hz (A)	8.0	18.4	15.2	21.4
	200V/60Hz (A)	7.8	18.4	15.2	21.4
	220V/60Hz (A)	7.5	16.9	14.6	20.2
No-fuse breaker capacity (A)		15	20	20	30
Mass (hydraulic oil excluded) (lbs.)		130 (59 kg)	141 (64 kg)	150 (68 kg)	132 (60 kg)
Standard Painted Color		Ivory White (Munsell code 5Y7.5/1)			
Usable Oil		Special mineral oil based special hydraulic oil/wear resistant hydraulic oil Viscosity grade: ISO VG32 to 68 Viscosity range: 15 - 400mm2/s (20-200 mm2/s recommended) Contamination: Within NAS class 9 (Class NAS10 or lower at 7MPa or less pressure). Volumetric water content: 0.1% max			
Tank Oil Temperature		32 - 140°F (Recommended: 59 - 122°F) / 0 - 60°C (Recommended: 15 - 50 °C)			
Operating Ambient Temperature		32 - 95°F / 0 - 40°C			
Ambient Humidity		85% RH maximum (no condensation)			
Installation Place		Indoors (fix with bolts without failure)			
Others		1. Be sure to connect a circuit breaker for all (three)poles and the earth leakage breaker. 2. Make sure that the electrical wiring meets the requirement of the European Standard EN60204-1 3. Be sure to connect the ground terminal.			



SUT	**	*	**	**	-	**	-	*	-	**	-	****
1	2	3	4	5		6		7		8		9

1 **Basic** - SUT: SUT Series

2 **Tank Capacities** - 00: Tankless
03: 30 L
06: 60 L
10: 100 L
16: 160 L

3 **Kind of Pump** - D: Tandem gear pump
S: Single gear pump

4 **Maximum Pump Discharge Rate** - 15: 15 L/min
30: 25 L/min
40: 40 L/min
60: 60 L/min
80: 80 L/min
110: 110 L/min

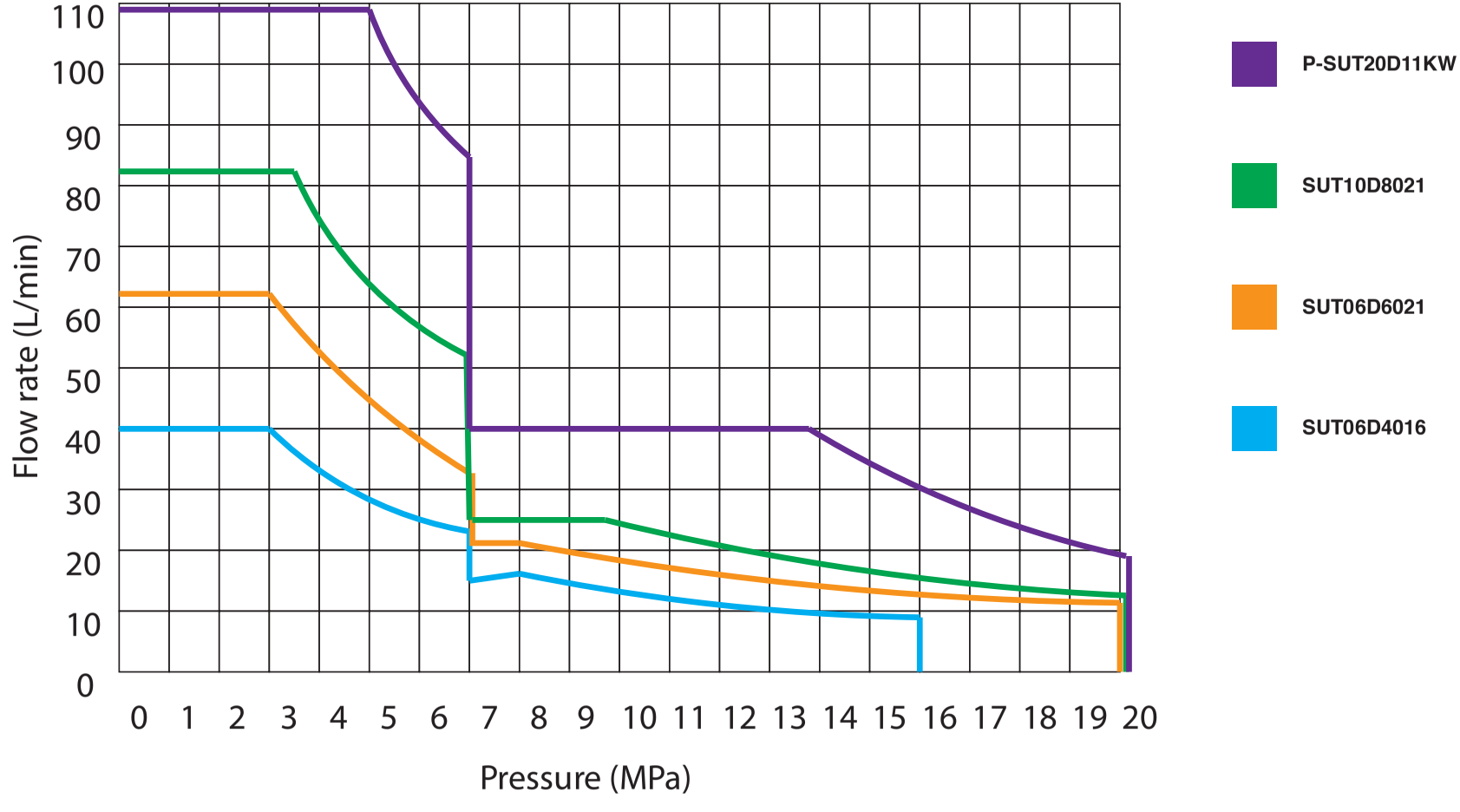
5 **Maximum Pressure** - 07: 0.7 MPa
10: 10.0 MPa
16: 15.7 MPa
21: 20.6 MPa

6 **Design #** - Number is progressed by model changes.

7 **Function Option** - No Symbol: No DC reactor, no noise filter
C: With communication function (RS232C)
P: With analog input function

8 **Hardware Option** - 01: Full Cover (except 30L tank)
02: Controller Cover (except for 7 kW)
03: DCL (except for 7kW)
04: Separate Power Supplies for Power & Control Systems
05: Water Fill Test Compliant Tank
06: Water Leak Test Compliant Tank
07: Level Switch
08: Temperature Switch
09: Thermometer
10: Micro Separator
11: Please Ask Specialist

9 **Non-standard No.** - No symbol: Standard
N***: Without Control System
A***: With Control System



Super Unit (SUT)

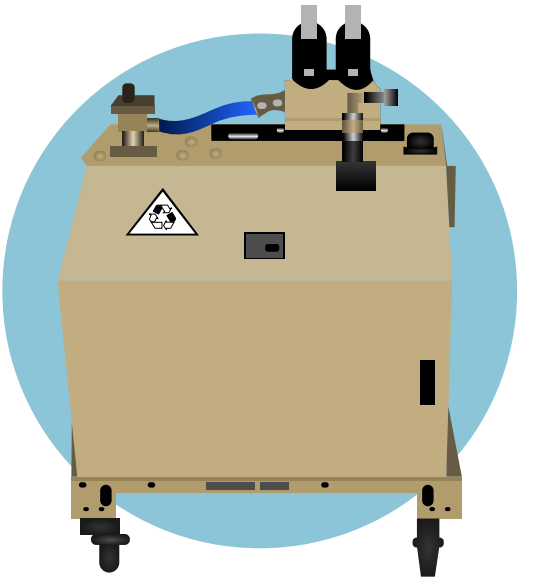
double pump

Model		SUT064016-30	SUT06D6021-30	SUT10D8021-30	P-SUT20D11KW-30
Max Operating Pressure (PSI)		2277 (15.7 MPa)	2988 (20.6 MPa)		
Operating Pressure Adjustment Range (PSI)		217 - 2227 (1.5 - 15.7 MPa)	217 - 2988 (1.5 - 20.6 MPa)		
Maximum Flow Rate (gal)		10.8 (41.0 L)	16.1 (61.1 L)	21.9 (83.0 L)	29.0 (110.0 L)
Operating Flow Rate Range (gal)		1.4 - 10.8 (5.4 - 41.0 L)	2.3 - 16.1 (8.7 - 61.1 L)	3.0 - 21.9 (11.6 - 83.0 L)	3.4 - 29.0 (13.3 - 110 L)
Motor Capacity (Nominal)		3.7kW	5.0kW	7.0kW	11.0kW
Tank Capacity (gal)		16-26 (60-100 L)		26-42 (100–160 L)	52.8 (200 L)
Power Supply (Motor Pump)		3-phase 200 V (50Hz), 200 V (60Hz) (Permissable Power Fluctuation +10%) * Be sure to use a commercial power supply for the power source. The use of inverter power supply may cause burn damage to the unit.			
External Input Signal		5 channels, photocoupler insulation, DC24 V (maximum of DC27 V) 5 mA per channel			
External Output Signal	Digital Output	2 channels, photo coupler insulation, FET output, DC 24 V 50 mA max per channel			
	Contact Output	1 channel, relay output, Content capacity: DC 30 V, 0.5 A (resistance load), 1 common contact			
Rated Current	200V/50Hz (A)	17.9	22.7	25.5	38.3
	200V/60Hz (A)	17.7	21.7	24.8	37.8
	220V/60Hz (A)	16.4	20.2	22.7	34.9
No-fuse breaker capacity (A)		20	30	50	75
Mass (hydraulic oil excluded) (lbs.)		207 (94 kg)	247 (112 kg)	319 (145 kg)	794 (360 kg)
Standard Painted Color		Ivory White (Munsell code 5Y7.5/1)			
Usable Oil		Special mineral oil based special hydraulic oil/wear resistant hydraulic oil Viscosity grade: ISO VG32 to 68 Viscosity range: 15 - 400mm²/s (20-200 mm²/s recommended) Contamination: Within NAS class 9 (Class NAS10 or lower at 7MPa or less pressure). Volumetric water content: 0.1% max			
Tank Oil Temperature		32 - 140°F (Recommended: 59 - 122°F) / 0 - 60°C (Recommended: 15 - 50 °C)			
Operating Ambient Temperature		32 - 95°F / 0 - 40°C			
Ambient Humidity		85% RH maximum (no condensation)			
Installation Place		Indoors (fix with bolts without failure)			
Others		1. Be sure to connect a circuit breaker for all (three)poles and the earth leakage breaker. 2. Make sure that the electrical wiring meets the requirement of the European Standard EN60204-1 3. Be sure to connect the ground terminal.			

COREPULL

HYDRAULIC POWER PACKS

FOR ELECTRIC INJECTION MOLDING MACHINES



- EHU-30R or SUT Core Hydraulics
- 63% Energy Savings
- Servo Driven Hydraulics
- Energy Myser Control System
- No Cooling Water Required
- 1-4 Core Capacity
- Standard or Custom

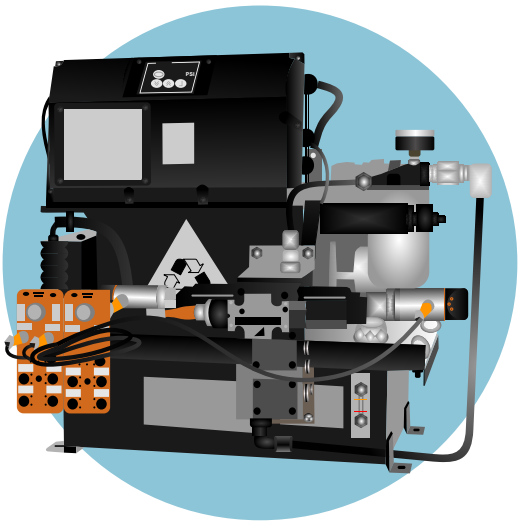
The advent of the electronic age brought industry more efficient plastic injection machines. All World's COREPULL system is the hydraulic package to match energy efficiencies demands. This HPU breaks from conventional core-pull units by using a fixed-displacement pump and variable-speed electric drive to match pump output to load demand. The control box at right houses electronic controls for interfacing with an injection molding machine's core-pull system and on-board pressure transducer, the motor accelerates to full speed in 0.1 second. All World's Electric Injection Molding Machines Hydraulic Power Packs rest on four swivel wheels for mobility and adaptability. Remote mounted keypad, Econo J-Box, and Super-Shot accumulator are all available as a-la-carte options for further versatility!

All World's Core Pull units are the leading plastic injection molding industry leader in hydraulic power packs with over 2,000 units sold nationwide. Our systems are used by top OEMs in the U.S.A. and Japan.

CLAMPMAX

HYDRAULIC POWER PACKS

FOR WORKHOLDING & CLAMPING SYSTEMS



- EHU Core Hydraulics (Up to 5,000 PSI)
- SUT Core Hydraulics (Up to 3,000 PSI)
- Minimal Leakage Potential
- Utilizes IFM Digital Pressure Switches
- Extremely Safe Operation
- Intensified or Non-intensified
- Standard or Custom

All World's CLAMPMAX is available in many packages and configurations to meet your clamping or workholding application's biggest challenges. IFM devices are IOT-ready and eliminate costly building, labor, and maintenance costs. Up to six valve packages available. Clamp monitoring options allow pressure monitoring of A, B, or both A/B line circuits. Units that use intensifier packages are built using an in-stack booster underneath the hydraulic valve, reducing what is intensified to just the A port to minimizes damage/leakage potential. An inline pressure 10 micron filter is built into every intensified system to ensure clean oil goes out to the machine circuit. The hybrid controller's handle of motor speed eliminates concern for over-speeding and damaging the intensifier. Non-intensified models are also available. Custom options are nearly limitless!

IoT

All World has partnered with Daikin Industries and IFM Electronics to bring the most user-friendly, network-smart hybrid hydraulic technology to North America's industrial market space. This power pack is just the beginning.

HYBRID OIL COOLER SERIES

AKZ
Oil

AKJ
Oil, Coolant, & Water

AKC
Coolant

AKW
Water

UNPARALLELED ENERGY SAVINGS AND TECHNOLOGY

Today's industrial machinery and machine tools heat up quickly, as they are constantly in motion and tend to run at a higher speed of spindles for precise processing. Many component applications require constant cooling to prevent deviation and inefficiencies in operation. Luckily, Daikin Industries has a cooling solution for every cooling application in industry. Daikin Hybrid Oil Coolers provide premium energy savings with unsurpassed technology for all cooling types: oil, lubricants, water, hydraulic fluids, and cutting fluids. Installed in each cooling unit is Daikin's patented IPM motor, which uses a rare-earth magnet to minimize thermal displacement of the tooling, provides stable actuation of the actuator, and prevents rising motor coil temperatures, and extends life and accuracy. Each unit is built tough to withstand the severe condition of factory dust and mist and are compliant with energy regulations in Asia, Europe, and Oceania.

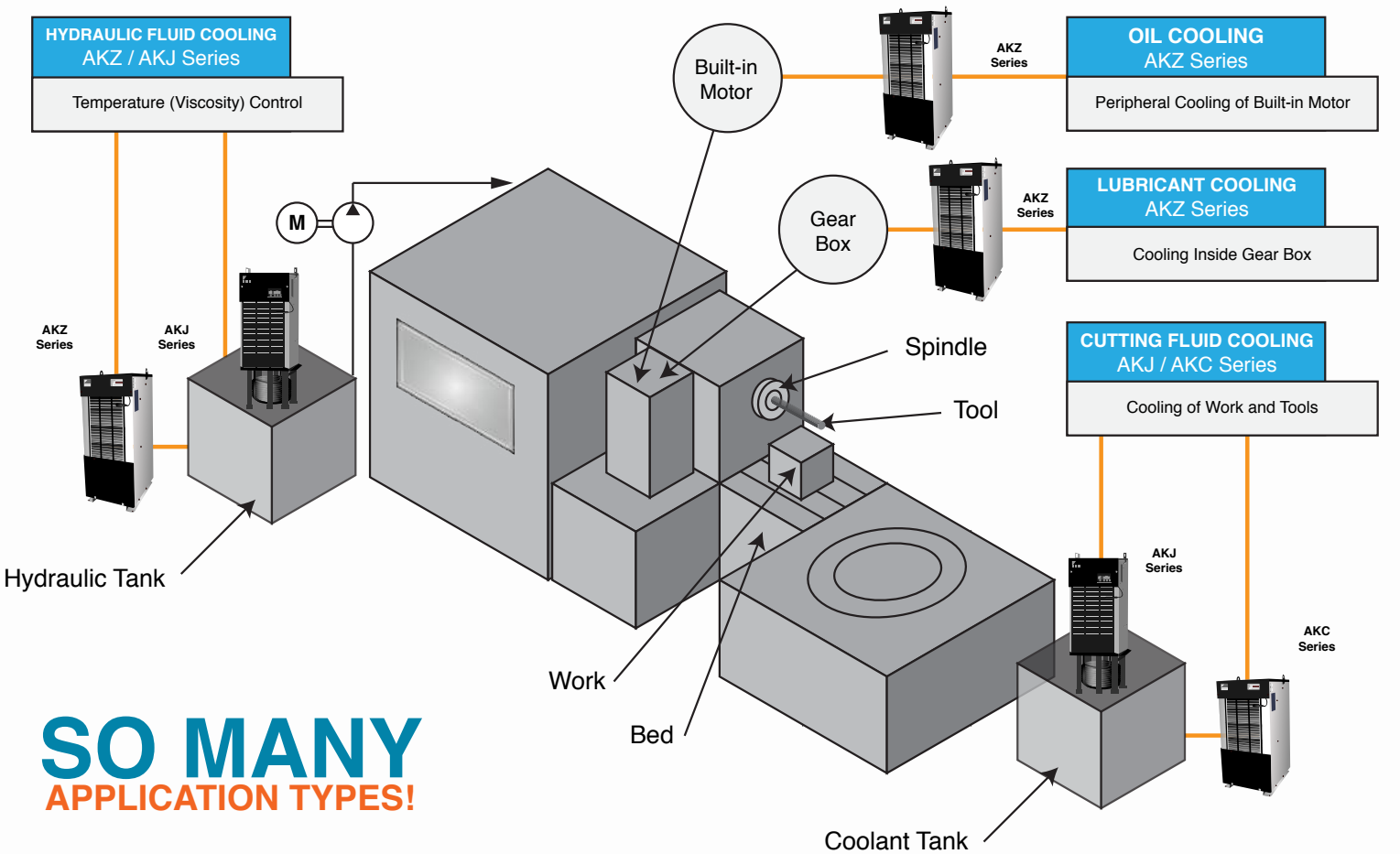
	With Breaker	CE Compliant	With Heater	With Tank	Different Voltages	With Pump
AKZ SERIES	●	●	●	●	●	
AKJ SERIES	●	●	●		●	
AKC SERIES		●	●			●
AKW SERIES	●	●	●		●	

ENERGY Lower energy consumption through advanced IPM motor technology inside the compressor and R410A refrigerant for high COP characteristics. Other features include low-noise reduced in-line with load reduction and measurable power consumption that can also be monitored from the operations panel. These features provide longer unit life, reduced energy cost, and sustainable savings.

TEMPERATURE CONTROL Daikin Oil Coolers embody a further evolution of high-accuracy temperature control. Precise oil temperatures accuracies differ by only ±0.18°F (±0.1°C) at a wide range of use. The cooling capacity resolution in the low-load range has been improved through optimal control of the compressor and electronic expansion valve.

ALARM FUNCTIONS Built-in advanced technology includes several state-of-the-art features to provide proper maintenance support for your unit including, a refrigerant gas leakage detection alarm function, an oil temperature warning function, an auto-tuning function, a 999-hour timer function, and a preventative maintenance function that notifies the operator when the air filter or condenser is clogged.

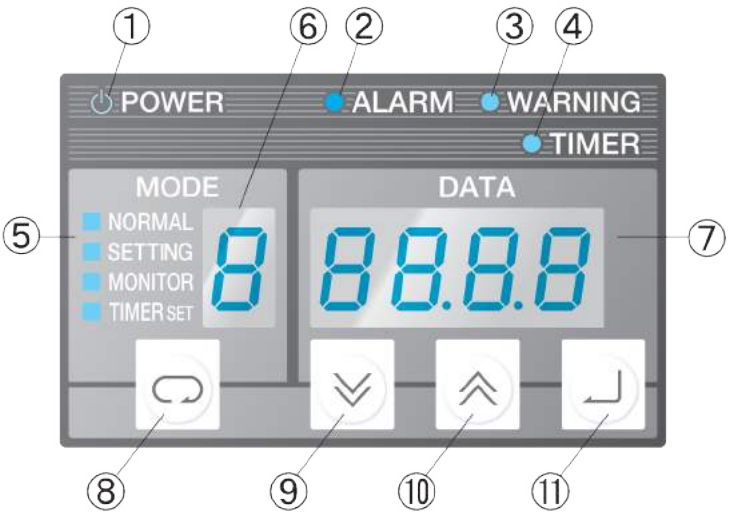
COMPATIBILITY Daikin Oil Coolers offer a variety of solutions for machine tool systems. Replacing an existing unit with a Daikin hybrid unit works in nearly 90% of standard industrial applications, helping reduce need for additional on-hand stock.



SO MANY
APPLICATION TYPES!

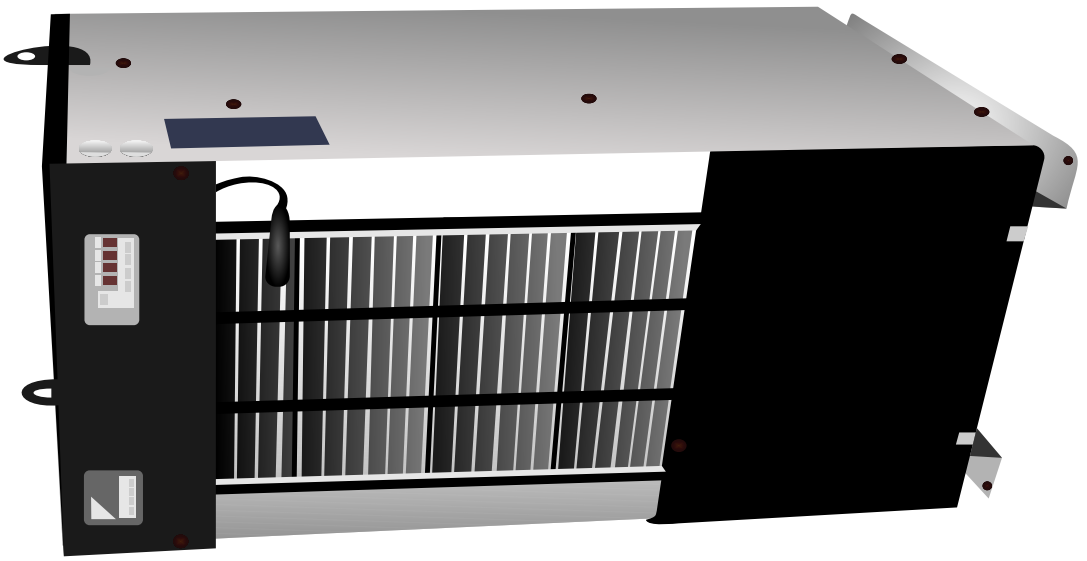
OIL COOLER CODE CHART

Symbol of Option Type	With Breaker			Compliance with CE				With Heater				With Tank	With Pump	Different Voltage (1)			Different Voltage (2)			Different Voltage (3)		
	AKZ	AKJ	AKW	AKZ	AKJ	AKC	AKW	AKZ	AKJ	AKC	AKW	AKZ	AKC	AKZ	AKJ	AKW	AKZ	AKJ	AKW	AKZ	AKJ	AKW
-B	o	o	o																			
-C				o	o	o	o															
-H								o	o	o	o											
-T												o										
-046														o	o	o						
-047	o	o															o	o	o			
-048	o	o																		o	o	o
-BC	o	o	o	o	o		o															
-BH	o	o	o					o	o		o											
-BT	o											o										
-CH				o	o	o	o	o	o	o	o											
-CT				o								o										
-HT								o				o										
-BCH	o	o	o	o	o		o	o	o		o											
-BCT	o			o								o										
-BHT	o							o				o										
-CHT				o				o				o										
-BCHT	o			o				o				o										
-001	o	o	o											o	o	o						
-002					o		o		o					o	o	o						
-003				o				o			o			o	o	o						
-004												o		o								
-005	o	o	o		o		o		o					o	o	o						
-006	o	o	o	o				o			o			o	o	o						
-007	o											o		o								
-008				o	o		o	o	o		o			o	o	o						
-009				o								o		o								
-010								o				o		o								
-011	o	o	o	o	o		o	o	o		o			o	o	o						
-012	o			o								o		o								
-013	o							o				o		o								
-014				o				o				o		o								
-015	o			o				o				o		o								
-017	o	o	o	o	o		o										o	o	o			
-018	o	o	o					o	o		o						o	o	o			
-019	o											o					o					
-023	o	o	o	o	o		o	o	o		o						o	o	o			
-024	o			o								o					o					
-025	o							o				o					o					
-029	o			o				o				o					o					
-032	o	o	o	o	o		o													o	o	o
-033	o	o	o					o	o		o									o	o	o
-034	o											o								o		
-038	o	o	o	o	o		o	o	o		o									o	o	o
-039	o			o								o								o		
-040	o							o				o								o		
-044	o			o				o				o								o		
-200													o									
C200						o							o									
H200										o			o									
K200						o				o			o									



NO.	ITEM	DESCRIPTION
1	**Power Lamp (Green)**	The lamp is continuously on while power is supplied.
2	**Error Warning Lamp (Red)**	LEVEL 1 ALARM - Lamp keeps blinking LEVEL 2 ALARM - Lamp is continuously on.
3	**Warning Lamp (Green)**	LEVEL 1 ALARM - Lamp keeps blinking LEVEL 2 ALARM - Lamp is continuously on.
4	**Timer Mode Lamp (Red)**	The lamp keeps blinking while the machine is at a stop in the timer mode.
5	**Operation Mode Display**	NORMAL - Normal Mode SETTING - Operation Setting Mode MONITOR- Monitor Mode TIMER SET- Timer Setting Mode
6	**Operation Mode/ Data No. Display**	Displays the current operation mode or data number of the data currently displayed on the data display.
7	**Data Display**	Displays various data. The data displayed differs depending on the operation mode and number.
8	**[SELECT] (Select) Key**	Selects the operation mode.
9	**[DOWN] Key**	Decrements the value of the operation mode, data number, or data by 1. When held for two seconds or longer, decrements the values by 10.
10	**[UP] Key**	Increments the value of the operation mode, data number, or data by 1. When held for two seconds or longer, increments the values by 10.
11	**[ENT] Confirm Key**	Confirms the edited operation mode/data number/data.

AKZ SERIES



AKZ	-	**	-	*	-	***
1		2		3		4

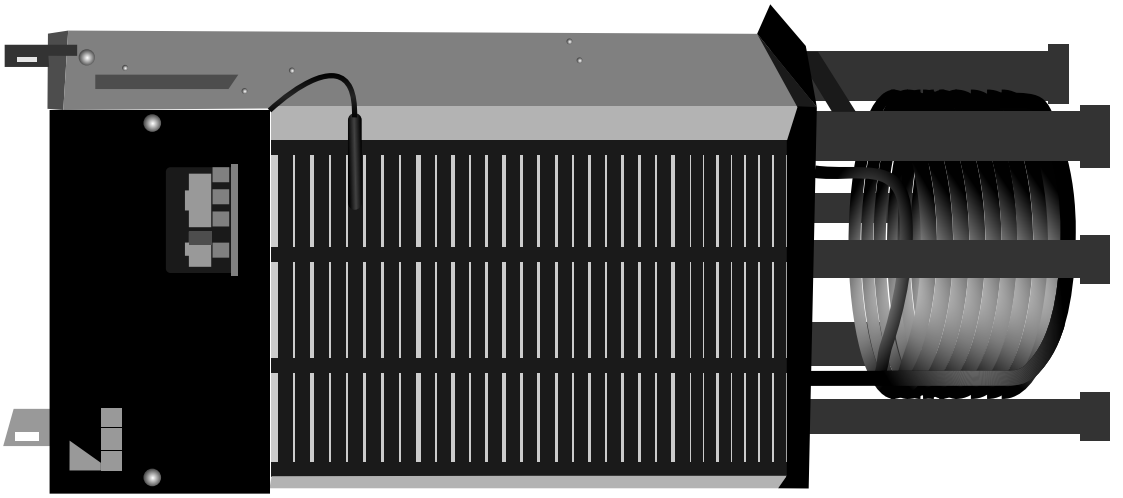
1	**Basic** - AKZ: High accuracy inverter oil cooling unit, circulating type, for cooling oil
2	**Cooling Capacity (kW)** - 14: 1.4 kW 32: 3.2 kW 43: 4.3 kW 56: 5.6 kW 90: 9.0 kW
3	**System of Series** - 9: Model Series
4	**Option Type** - Options and their combinations, between 1 to 3 digits long

Model		AKZ149						AKZ329						AKZ439						AKZ569						AKZ909					
Horsepower (HP)		0.5						1.2						1.5						2.0						3.0					
Model Type		Standard	-B	-C	-H	-T	Different Voltage Specifications	Standard	-B	-C	-H	-T	Different Voltage Specifications	Standard	-B	-C	-H	-T	Different Voltage Specifications	Standard	-B	-C	-T	-H	Different Voltage Specifications	Standard	-B	-C	-T	-H	Different Voltage Specifications
Cooling Capacity (50/60 Hz kW)		1.3/1.4						2.8/3.2						3.8/4.3						5.0/5.6						8.0/9.0					
Power Supply *2		Three-phase AC 200/200-220 V 50/60Hz					*3	Three-phase AC 200/200-220 V 50/60Hz					*3	Three-phase AC 200/200-220 V 50/60Hz					*3	Three-phase AC 200/200-220 V 50/60Hz					*3	Three-phase AC 200/200-220 V 50/60Hz					*3
Power Voltage	Main Circuit *3	Three-phase AC 200/200-220 V 50/60Hz																													
	Operation Circuit	DC12/24 V																													
Max Power & Current Consumption	200 V 50 Hz	0.90 kW/3.9 A		1.29 kW/4.1 A		0.90 kW/3.9 A	*10	1.36 kW/4.9 A		1.49 kW/4.8 A		1.36 kW/4.9 A	*10	1.80kW/6.6 A					*10	2.22kW/7.7 A			2.50kW/8.4 A		*10	4.25kW/13.6 A					*10
	200 V 60 Hz	0.91 kW/3.6 A		1.32 kW/4.2 A		0.91 kW/3.6 A		1.43 kW/4.8 A		1.61 kW/5.2 A		1.43 kW/4.8 A		1.88 kW/6.4 A						2.30kW/7.6 A			2.57kW/8.1 A			4.30kW/13.5 A					
	220 V 60 Hz	0.91 kW/3.5 A		1.43 kW/4.2 A		0.91 kW/3.5 A		1.43 kW/4.6 A		1.72 kW/5.0 A		1.43 kW/4.6 A		1.88kW/6.1 A						2.30kW/7.3 A			3.00kW/8.9 A			4.28kW/13.0 A					
Transformer Capacity		-					2.6kVA	-					2.6kVA	-					2.6kVA	-					4.0kVA	-					6.0kVA
External Dimensions HxWxD (in.)		26 x 14 x 17		37 x 14 x 17		32 x 14 x 21	37 x 14 x 17	31 x 14 x 17		42 x 14 x 17		38 x 14 x 21	42 x 14 x 17	34 x 14 x 17		46 x 14 x 17		42 x 14 x 21		44 x 19 x 22		54 x 19 x 23	56 x 19 x 22		54 x 19 x 23	48 x 22 x 27		58 x 22 x 28		60 x 22 x 27	58 x 22 x 26
Compressor		Equivalent to 0.4 kW						Equivalent to 0.75 kW						Equivalent to 1.1 kW						Equivalent to 1.5 kW						Equivalent to 2.2 kW					
Oil Pump	Motor	0.4 kW x 4-pole motor																		0.7 kW x 4P											
	Th. Discharge Rate (G/min)	3.17/3.80 (12/14.4 L/min)						6.34/7.60 (24/28.8 L/min)												7.92/9.51 (30/36 L/min)											
	Open Pressure (PSI)	72.5 (0.5 MPa)						87.0 (0.6 MPa)																							
Temperature Control (Selectable)	Standard	Synchronization Type: Room Temperature or Machine Temperature *4 (Set to room temperature by default)																													
	Controlled Object	Synchronization Type: Inlet Oil Temperature or Oil Outlet Temperature (Set to inlet oil temperature by default)																													
	Synchronization Range (K)	Synchronization Type: -9 to +9.9 against the standard temperature (Set at 0.0 by default)																													
	Controlled Object	Fixed Type: Oil inlet temperature or oil outlet temperature																													
	Range (°F)	Fixed Type: 41 to 122 (5 to 50 °C)																													
Refrigerant (R410A) *5 Filling Volume (lbs)		1.08 (0.49 kg)						1.59 (0.72 kg)						2.16 (0.98 kg)						2.24 (1.02 kg)						3.26 (1.48 kg)					
Protection Devices		A set of over current relay (for a pump motor), reverse-phase protection device, restart prevention timer, low room temperature protection thermostat, high fluid temperature protection thermostat, low fluid temperature protection thermostat, relief valve (for a pump), discharge pipe temperature thermostat, condenser temperature thermostat, refrigerant leakage detector, inverter protection device. High-pressure switch (-C type only), compressor thermal protector (-C type only), overheat prevention temperature thermostat (-H type only), boil-dry protection switch (-H type only), no-fuse breaker (-B type only)																													
Operation Range	Room Temperature (°F)	41 to 113 (5 to 45 °C)																													
	Oil Inlet Temperature (°F)	41 to 122 (5 to 50 °C)																													
	Oil Viscosity (in^2)	0 to 0.31 (1.4 to 200 mm^2 [ISO VG2 to 32])																													
	External Pressure Loss (PSI)	Discharge Side: 72.5 (0.5 MPa maximum), Suction Side: No lower than -4.45 (-30.7 kPa)																													
Acceptable Oils		Lubricating oil, mineral oil based hydraulic oil (except for phosphate ester hydraulic oil, water, water-soluble liquid, chemicals, food products, fuel, cutting fluid, grinding fluid, etc.)																													
Noise Level dB (A)		62												65												67					
Mass (lbs)		112 (51 kg)		172 (78 kg)		150 (68 kg)	192 (87 kg)	123 (56 kg)		183 (83 kg)		161 (73 kg)	203 (92 kg)	141 (64 kg)		201 (91 kg)	179 (81 kg)	220 (100 kg)		181 (82 kg)		254 (115 kg)	220 (100 kg)		320 (145 kg)	214 (97 kg)		291 (132 kg)		269 (122 kg)	386 (175 kg)
Oil Tank Capacity (G)		-				4 (15 L)	-	-				5 (20 L)	-	-			5 (20 L)	-		-		13 (50 L)	-			-		18 (70 L)		-	

Notes:

*1 The cooling capacity indicates the value at the standard point (tank fluid temperature: 35°C, room temperature: 35°C, fluid used: ISO VG32). This unit has about ±5% of product tolerance.
*2 Use a commercial power supply for the power source. The use of an inverter power supply may cause burn damage to the machine. The voltage fluctuation range should be within ±10%. If it is more than ±10%, please consult us.
*3 There are three different types of voltage specifications depending on the power source: -046, -047 and -048 units. -047 and -048 units deal with the different voltage by featuring a transformer. The main circuit voltage is the transformer's secondary side voltage of AC 200 V, 50/60 Hz.
*4 The machine temperature synchronization thermistor available as an option is required for this function. (Refer to Page L-37 for details.)
*5 The –C type comes with the refrigerant R410A SDS (Safety Data Sheet).
*6 Electric component box ingress protection: IP54 or equivalent (However, use piping conduits etc. rated at least IP54 at wiring ports.)
*7 The specifications for permissible transport vibration are those of a standard unit.
*8 The molded-case circuit breaker is not supplied with this product. Please prepare it yourself.
*9 The yellow line on the tank oil level gauge shows the highest oil level and the red line the lowest oil level.
*10 The maximum power consumption/maximum current consumption of different voltage specifications are shown in the tables below.

AKJ SERIES

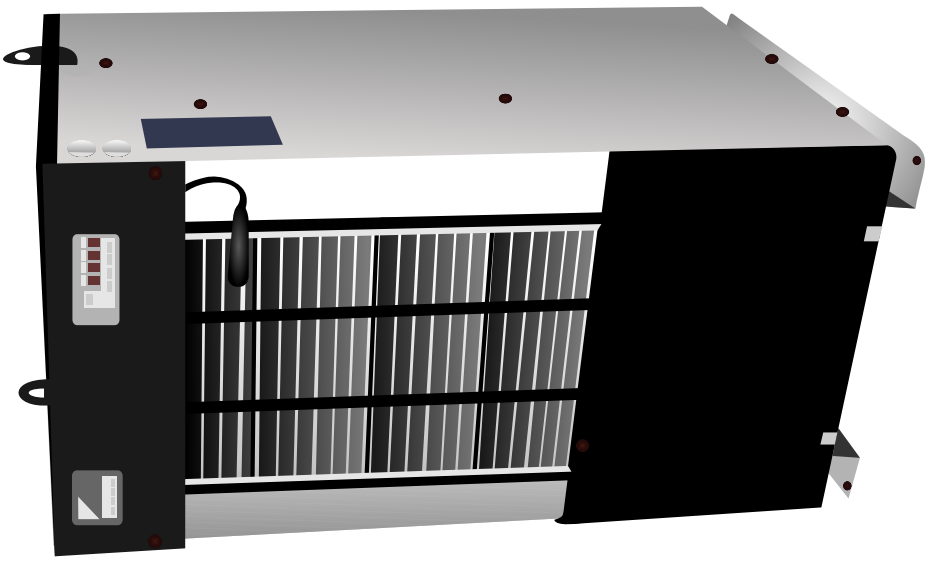


AKJ	-	**	-	*	-	***
1		2		3		4

1	**Basic** - AKJ: High precision inverter units, immersion types, for cutting/ grinding fluid
2	**Cooling Capacity (kW)** - 18: 1.8 kW 35: 3.5 kW 45: 4.5 kW 56: 5.6 kW 90: 9.0 kW 150: 15.0 kW
3	**System of Series** - 9: Model Series
4	**Option Type** - Options and their combinations, between 1 to 3 digits long

Model		AKJ149					AKJ329					AKJ439					AKJ569					AKJ909					AKJ1509				
Horsepower (HP)		0.5					1.2					1.5					2.0					3.0					5.0				
Model Type		Standard	-B	-C	-H	Different Voltage Specifications	Standard	-B	-C	-H	Different Voltage Specifications	Standard	-B	-C	-H	Different Voltage Specifications	Standard	-B	-C	-H	Different Voltage Specifications	Standard	-B	-C	-H	Different Voltage Specifications	Standard	-B	-C	-H	Different Voltage Specifications
Cooling Capacity (50/60 Hz kW)		1.6/1.8					3.2/3.5					4.2/4.5					5.0/5.6					8.0/9.0					15.0/15.0				
Power Supply *2		Three-phase AC 200/200-220 V 50/60Hz				*3	Three-phase AC 200/200-220 V 50/60Hz				*3	Three-phase AC 200/200-220 V 50/60Hz				*3	Three-phase AC 200/200-220 V 50/60Hz				*3	Three-phase AC 200/200-220 V 50/60Hz				*3	Three-phase AC 200/200-220 V 50/60Hz				*3
Power Voltage	Main Circuit *3	Three-phase AC 200/200-220 V 50/60Hz																												
	Operation Circuit	DC12/24 V																												
Max Power & Current Consumption	200 V 50 Hz (Cooling)	0.82 kW/3.3 A				*8	1.37 kW/5.2 A				*8	1.46 kW/5.6 A				*8	2.77 kW/9.4 A				*8	3.38 kW/10.8 A				*8	5.40 kW/17.3 A				*8
	200 V 60 Hz (Cooling)	0.83 kW/3.2 A					1.38 kW/5.1 A					1.48 kW/5.4 A					2.72 kW/9.2 A					3.43 kW/10.7 A					5.37 kW/16.9 A				
	220 V 60 Hz (Cooling)	0.83 kW/3.0 A					1.39kW/4.8 A					1.48 kW/5.1 A					2.83 kW/8.9 A					3.43 kW/10.2 A					5.40 kW/15.7 A				
	200 V 50 Hz (Heating)	-		1.20 kW/3.8 A		-	-		1.20 kW/3.8 A		-	-		1.20 kW/3.8 A		-	-		2.32 kW/7.1 A		-	-		4.42 kW/13.1 A		-	-		4.60 kW/13.8 A		-
	200 V 60 Hz (Heating)	-		1.20 kW/3.8 A		-	-		1.20 kW/3.8 A		-	-		1.20 kW/3.8 A		-	-		2.33 kW/7.1 A		-	-		4.45 kW/13.1 A		-	-		4.60 kW/13.7 A		-
	220 V 60 Hz (Heating)	-		1.44 kW/4.2 A		-	-		1.44 kW/4.2 A		-	-		1.44 kW/4.2 A		-	-		2.79 kW/7.8 A		-	-		5.33 kW/14.4 A		-	-		5.49 kW/15.7 A		-
Transformer Capacity		-				2.14kVA	-				2.14kVA	-				2.14kVA	-				2.79kVA	-				5.02kVA	-				7.7kVA
External Dimensions HxWxD (in.)		36 x 14 x 17					41 x 14 x 17					47 x 14 x 17					57 x 19 x 20					64 x 22 x 24					77 x 29 x 29				
Compressor		Equivalent to 0.4 kW					Equivalent to 0.75 kW					Equivalent to 1.1 kW					Equivalent to 1.5 kW					Equivalent to 2.2 kW					Equivalent to 1.5 kW + Equivalent to 2.2 kW				
Temperature Control (Selectable)	Standard	Synchronization Type: Room Temperature or Machine Temperature *4 (Set to "room temperature: mode 3"by default)																												
	Controlled Object	Synchronization Type: Tank Fluid Temperature																												
	Synchronization Range (K)	Synchronization Type: -9 to +9.9 against the standard temperature (Set at 0.0 by default)																												
	Controlled Object	Fixed Type: Tank Fluid Temperature																												
	Range (°F)	Fixed Type: 41 to 122 (5 to 50 °C)																												
Refrigerant (R410A) *5 Filling Volume (lbs)		1.21 (0.55 kg)					1.67 (0.76 kg)					2.18 (0.99 kg)					2.36 (1.07 kg)					3.48 (1.58 kg)					2.36 + 3.48 (1.07 + 1.5 kg)				
Protection Devices		Agitator internal thermostat, discharge pipe temperature thermostat, condenser temperature thermostat, reverse-phase protection device, restart prevention timer, low room temperature protection thermostat, high fluid temperature protection thermostat, low fluid temperature protection thermostat, refrigerant leakage detector set, circuit breaker (–B type only), high-pressure pressure switch (–C type only), compressor protection thermostat (–C type only), heating prevention temperature switch (–H type only), and temperature fuse (–H type only).																												
Operation Range	Room Temperature (°F)	41 to 113 (5 to 45 °C)																												
	Oil Inlet Temperature (°F)	41 to 122 (5 to 50 °C)																												
	Oil Viscosity (in²)	0 to 0.31 (0.5 to 200 mm^2																												
Aceptable Oils		Water-soluble cutting/grinding fluid, cutting/grinding oil, lubrication oil, hydraulic oil, industrial water (Cannot be used for drugs, food products, and fuel)																												
Noise Level dB (A)		62															65					68					69				
Mass (lbs)		84 (38 kg)		88 (40 kg)		132 (60 kg)	97 (44 kg)			101 (46 kg)	146 (66 kg)	110 (50 kg)		115 (52 kg)		159 (72 kg)	159 (72 kg)		165 (75 kg)		213 (97 kg)	196 (89 kg)		205 (93 kg)		258 (117 kg)	309 (140 kg)		317 (144 kg)		397 (180 kg)
Notes:		*1. The cooling capacity indicates the value at the standard point (tank fluid temperature: 35°C, room temperature: 35°C, fluid used: ISO VG32 <water in the case of AKJ1509>). This unit has about ±5% of product tolerance. *2. Use a commercial power supply for the power source. The use of an inverter power supply may cause burn damage to the machine. The voltage fluctuation range should be within ±10%. If the voltage fluctuation range is more than ±10%, please consult us. *3. There are the following three types of different voltage specifications. AC220, 230 V : Option code –046 (without transformer) AC380, 400, 415 V : Option code –047 (with built-in transformer) AC440, 460, 480 V : Option code –048 (with built-in transformer) The main circuit voltage is the transformer's secondary side voltage of AC 200 V, 50/60 Hz. *4. The machine temperature synchronization thermistor available as an option is required for this function. (Refer to the catalog for each oil cooling unit for details.) *5. The SDS (Safety Data Sheet) of refrigerant R410A is attached to the -C type. *6. Electric component box ingress protection: IP54 or equivalent (However, use piping conduits etc. rated at least IP54 at wiring ports.) *7. The molded-case circuit breaker is not supplied with this product. Please prepare it yourself. *8. The maximum power consumption/maximum current consumption of different voltage specifications can be obtained from our engineers.																													

AKC SERIES

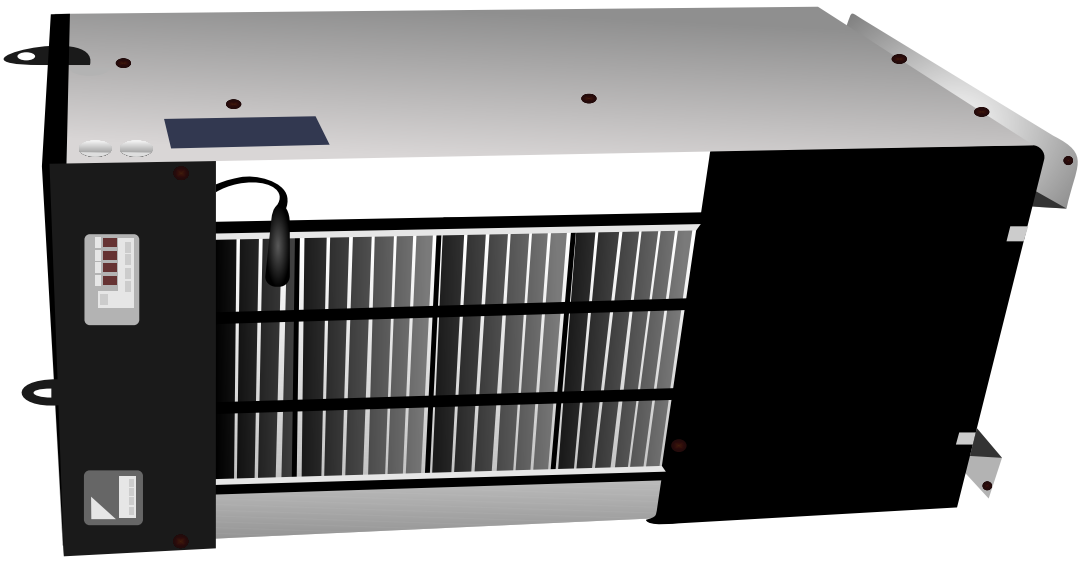


AKC	-	**	-	*	-	***
1		2		3		4

1	**Basic** - AKC: High accuracy inverter controlled oil cooling unit, coolant circulating type
2	**Cooling Capacity (kW)** - 35: 3.5 kW 56: 5.6 kW
3	**System of Series** - 9: Model Series
4	**Option Type** - Options and their combinations, between 1 to 3 digits long

Model		AKC359				AKC569			
Horsepower (HP)		1.2				2.0			
Model Type		Standard	-C (CE Compliant Type)	-H (With Heater)	-200 (With Pump)	Standard	-C (CE Compliant Type)	-H (With Heater)	-200 (With Pump)
Cooling Capacity (50/60 Hz kW)		3.5/3.5			3.2/3.2	5.6/5.6			5.3/5.3
Heater		-		1	-	-		2	-
Power Supply *2		Three-phase AC 200/200-220 V 50/60Hz							
Power Voltage	Main Circuit *3	Three-phase AC 200/200-220 V 50/60Hz							
	Operation Circuit	DC12/24 V							
Max Power & Current Consumption	200 V 50 Hz	1.71 kW/4.2 A			1.44 kW/5.3 A	1.78 kW/6.2 A		2.34 kW/7.0 A *3	2.10 kW/7.4 A
	200 V 60 Hz	1.22 kW/4.3 A			1.60 kW/5.5 A	1.87 kW/6.3 A		2.34 kW/7.0 A *3	2.30 kW/7.6 A
	220 V 60 Hz	1.21 kW/4.1 A			1.60 kW/5.2 A	1.88 kW/6.1 A		2.81 kW/7.6 A *3	2.30 kW/7.3 A
External Dimensions HxWxD (in.)		39 x 18 x 22				47 x 19 x 26			
Compressor		Equivalent to 0.75 kW				Equivalent to 1.5 kW			
Pump	Motor	-			0.4 kW x 4-pole motor	-			0.4 kW x 4-pole motor
	Total Head (50/50 Hz)	-			10/15 m	-			10/15 m
	Suction Lift	-			0.5 m *4	-			0.5 m *4
Temperature Control (Selectable)	Standard	Synchronization Type: Room Temperature or Machine Temperature *4 (Set to room temperature by default)							
	Controlled Object	Synchronization Type: Fluid Inlet Temperature or Fluid Outlet Temperature (Set to fluid inlet temperature by default)							
	Synchronization Range (K)	Synchronization Type: -9 to +9.9 against the standard temperature (Set at 0.0 by default)							
	Controlled Object	Fixed Type: Fluid Inlet Temperature or Fluid Outlet Temperature							
	Range (°F)	Fixed Type: 41 to 122 (5 to 50 °C)							
Refrigerant (R410A) *5 Filling Volume (lbs)		1.77 (0.80 kg)				2.76 (1.25 kg)			
Protection Devices		A set of overcurrent relay (for a pump motor), discharge pipe temperature thermostat, condenser temperature thermostat, reverse-phase protection device, restart prevention timer, low room temperature protection thermostat, high fluid temperature protection thermostat, low fluid temperature protection thermostat, refrigerant leakage detector, evaporator clogging detection (intake pipe temperature thermostat), inverter protection device, circuit breaker, temperature fuse (-H type only), overheat prevention temperature switch (-H type only), high pressure switch (-C type only), and compressor thermal protector (-C type only)							
Operation Range	Room Temperature (°F)	41 to 113 (5 to 45 °C)							
	Fluid Inlet Temperature (°F)	41 to 122 (5 to 50 °C)							
	Fluid Viscosity (in^2)	0.31 maximum (200 mm^2 maximum [water soluble to ISO VG32])							
	Withstanding Pressure (PSI)	29 (0.2 MPa)							
	Rated Circulating Volume (G/Min)	9.25 (35 L/min)							
	Circulating Volume (G/min)	4 minimum (15 L/min minimum)							
Acceptable Fluids		Lubrication oil, hydraulic oil, cutting oil, (water based) coolant, (grinding oil *8) (Use clean fluid that can pass through filter equipment with a screen mesh of 40 or greater.)							
Noise Level dB (A)		62				65			
Mass (lbs)		183 (83 kg)		190 (86 kg)	232 (105 kg)	220 (100 kg)		234 (106 kg)	269 (122 kg)
Notes:		*1 The cooling capacity indicates the value at the standard point (fluid inlet temperature: 35°C, room temperature: 35°C, fluid used use: ISO VG32, flow rate: rated circulating volume). This unit has about ±5% of product tolerance. *2 Use a commercial power supply for the power source. The use of an inverter power supply may cause burn damage to the machine. The voltage fluctuation range should be within ±10%. If it is more than ±10%, please consult us. *3 The maximum power consumption/maximum current consumption indicates the value when heating fluid with the heater. The values when cooling fluid with the cooler are the same as with the standard models. *4 Indicates the maximum value with clean fresh water. *5 The optional thermistor for machine temperature synchronization is required. *6 The –C type comes with the refrigerant R410A SDS (Safety Data Sheet). *7 Use with water, chemicals, food or fuels is not possible. *8 If the unit is used for a grinding machine or similar equipment, the evaporator tends to become clogged with foreign material, necessitating frequent maintenance of the evaporator or a considerably shorter pump service life due to wear of the pump parts (mainly the mechanical seals). *9 Not applicable to models without a pump *10 The rotational speed of the fan varies depending on the room temperature to conserve energy. Therefore, it is normal for the noise level to vary accordingly. *11 Ingress protection for switch box: equivalent to IP54 (When wired with IP54 or higher conduit tube or other protection on the wiring port.)							

AKW SERIES



AKW	-	**	-	*	-	***
1		2		3		4

1	**Basic** - AKW: High accuracy inverter controlled oil cooling unit, circulating type, for clean fresh water, tap water
2	**Cooling Capacity (kW)** - 14: 1.4 kW 18: 1.8 kW 32: 3.2 kW 43: 4.3 kW 45: 4.5 kW 56: 5.6 kW 90: 9.0 kW
3	**System of Series** - 9: Model Series
4	**Option Type** - Options and their combinations, between 1 to 3 digits long

Model		AKW149	AKW329	AKW439	AKW189	AKW359	AKW459	AKW569	AKW909
Pump/Tank		With pump/tank			Without pump/tank			With pump/tank	
Horsepower (HP)		0.5	1.2	1.5	0.5	1.2	1.5	2.0	3.0
Cooling Capacity (50/60 Hz kW)		1.4/1/4	3.2/3.2	4.3/4.3	1.8/1.8	3.5/3.5	4.5/4.5	5.6/5.6	9.0/9.0
Power Supply *2		Three-phase AC 200/200-220 V 50/60Hz							
Power Voltage	Main Circuit *3	Three-phase AC 200/200-220 V 50/60Hz							
	Operation Circuit	DC12/24 V							
Max Power & Current Consumption	200 V 50 Hz	1.20 kW/4.5 A	1.71 kW/6.6 A	1.97 kW/ 7.4 A	0.79 kW/3.2 A	1.29 kW/5.2 A	1.59 kW/6.1 A	2.64 kW/8.5 A	4.81 kW/15.5 A
	200 V 60 Hz	1.36 kW/4.8 A	1.87 kW/6.6 A	2.20 kW/ 7.8 A	0.79 kW/3.2 A	1.29 kW/5.0 A	1.61 kW/6.0 A	2.78 kW/9.0 A	4.89 kW/15.3 A
	220 V 60 Hz	1.36 kW/4.8 A	1.87 kW/6.6 A	2.20 kW/ 7.8 A	0.79 kW/3.0 A	1.29 kW/4.7 A	1.61 kW/5.4 A	2.84 kW/8.4 A	5.03 kW/14.6 A
External Dimensions HxWxD (in.)		27 x 14 x 28	32 x 14 x 28	36 x 14 x 28	26 x 14 x 17	31 x 14 x 17	35 x 14 x 17	47 x 19 x 20	52 x 22 x 26
Water Pump	Motor (W)	54			-			100	
	Head (50/60 Hz) *3	25/37 m at 2.64 G/min 10 L/min	24/36 m at 3.96 G/min (15 L/min)		-			14/32 m at 7.92 G/min (30 L/min)	12/36 m at 13.20 G/min (50 L/min)
	Motor Capacity (50/60 Hz)	33/52			-			0.4	0.75
Temperature Control (Selectable)	Standard	Synchronization Type: Room Temperature or Machine Temperature *4 (Set to room temperature by default)							
	Controlled Object	Synchronization Type: Water Temperature in Tank			Synchronization Type: Outlet Water Temperature			Synchronization Type: Water Temperature in Tank or Outlet Temperature	
	Synchronization Range (K)	Synchronization Type: -9 to +9.9 K							
	Controlled Object	Fixed Type: Water Temperature in Tank			Fixed Type: Outlet Water Temperature			Fixed Type: Water Temperature in Tank or Outlet Temperature	
	Range (°F)	Fixed Type: 50 to 104 (10 to 40 °C)						Fixed Type: 41 to 113 (5 to 45 °C)	
Refrigerant (R410A) *5 Filling Volume (lbs)		1.08 (0.49 kg)	1.59 (0.72 kg)	2.16 (0.98 kg)	1.08 (0.49 kg)	1.59 (0.72 kg)	2.16 (0.98 kg)	2.25 (1.02 kg)	3.26 (1.48 kg)
Protection Devices		A set of overcurrent relay (for a pump motor, only for models with a pump), reverse-phase protection device, restart prevention timer, low room temperature protection thermostat, high fluid temperature protection thermostat, low fluid temperature protection thermostat, discharge pipe temperature thermostat, condenser temperature thermostat, refrigerant leakage detector, inverter protection device, high pressure switch (-C type only), compressor thermal protector (-C type only), intake pipe temperature thermostat (antifreeze), and circuit breaker (-B type only)							
Operation Range	Room Temperature (°F)	41 to 104 (5 to 40 °C)						41 to 113 (5 to 45 °C)	
	Water Temperature in Tank (°F)	41 to 104 (5 to 40 °C)			-			41 to 113 (5 to 45 °C)	
	Outlet Water Temperature (°F)	-			50 to 104 (10 to 40 °C [*5 5 to 40 °C])			-	
	Permissible Circulating Water Volume (G/min)	1.58 to 2.64 (6 to 10 L/min)	2.64 to 5.28 (10 to 20 L/min)	2.64 to 7.93 (10 to 30 L/min)	1.58 to 2.64 (6 to 10 L/min)	2.64 to 5.28 (10 to 20 L/min)	2.64 to 7.93 (10 to 30 L/min)	5.28 to 10.57 (20 to 40 L/min)	10.57 to 15.85 (40 to 60 L/min)
	Rated Circulating Water Volume (G/min)	2.64 (10 L/min)	3.96 (15 L/min)		2.64 (10 L/min)	3.96 (15 L/min)		7.93 (30 L/min)	13.20 (50 L/min)
	Acceptable Fluid	Fresh water (tap water)							
	Max Pressure in a Cooling Water Circuit (PSI)	-			0.5			-	
Noise Level dB (A)		60	61	62	60	61	62	65	67
Mass (lbs)		134 (61 kg)	143 (65 kg)	150 (68 kg)	79 (36 kg)	88 (40 kg)	95 (43 kg)	198 (90 kg)	231 (105 kg)
Tank Capacity (G)		2.64 (10 L)			-			3.96 (15 L)	5.28 (20 L)
Notes:		*1 The cooling capacity indicates the value at the standard point. This unit has about ±5% of product tolerance. *2 Use a commercial power supply for the power source. The use of an inverter power supply may cause burn damage to the machine. *3 This unit has about ±7% of product tolerance. *4 The machine temperature synchronization thermistor available as an option is required for this function. *5 A unit that can be used at a room temperature of 5 to 40°C or a tank outlet water temperature of 5 to 40°C is available as an option. Please consult us for details. *6 Use the unit with a circulating water volume within the permissible range. *7 Use fluid that satisfies the water quality standard for clean fresh water (tap water) level indicated on Page L-32. (Taken from Guideline of Water Quality for Refrigeration and Air Conditioning Equipment (JRA-GL-02-1994).)							