

ECO UNIT

Energy-Conservation Unit for Shimadzu Servopulser Hydraulic Power Supply Unit

ECU1/ECU2 Series



Up to 50 % energy savings

Contributes to reduced CO₂ emissions and lower running costs

Do you know how much electric power your hydraulic power supply unit consumes?

A conventional hydraulic power supply unit for fatigue and endurance testing machines runs continuously at full power in order to generate the maximum test force and test speed at any time. As the hydraulic power supply unit is selected to provide the maximum capacity for the expected testing, the power consumption may be excessive under some test conditions.

Installing an Eco Unit can cut power consumption by up to 50 %*!

The Eco Unit saves energy by reducing the power from the hydraulic power supply unit according to the test conditions and circumstances. In addition, the hydraulic power supply unit runs at reduced power in standby status.

* For ECU2 in 60 Hz area. (Max. 30 % for ECU1.)

Power Savings with Energy-Saving Operation

Retrofit to existing hydraulic power supply units

Note) A site investigation must be performed before retrofitting to an existing hydraulic power supply unit.

Note) Retrofitting may not be possible if the installation environment does not meet standard requirements. Retrofitting is not possible on a system that uses multiple testing machines sharing a single hydraulic power supply unit.

An Eco Unit can be retrofitted to an existing QF-A/QF-B/AF Series hydraulic power supply unit. (A 4830 servo controller is required to set energy-saving operation.)

Remote operation

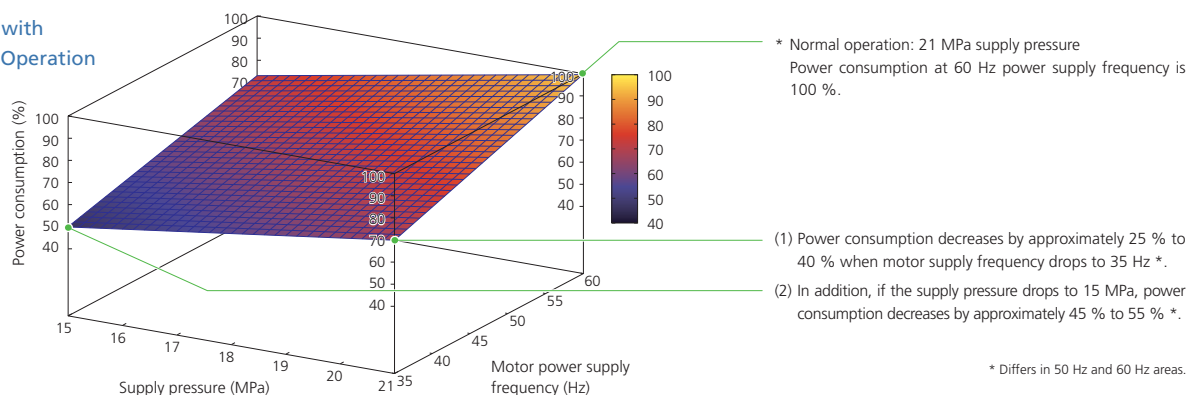
Energy-saving settings (motor set frequency and supply pressure) for the hydraulic power supply unit can be set from the 4830 servo controller or Windows software. (Patent pending)

Optimal energy-saving operation performed automatically

If Windows software is used with the Eco Unit, the optimal energy-saving operation can be performed automatically according to the test conditions and circumstances. It ensures effective energy-saving operation while performing the target testing.

Energy-saving operation suppresses the noise and heat generation from the hydraulic power supply unit.

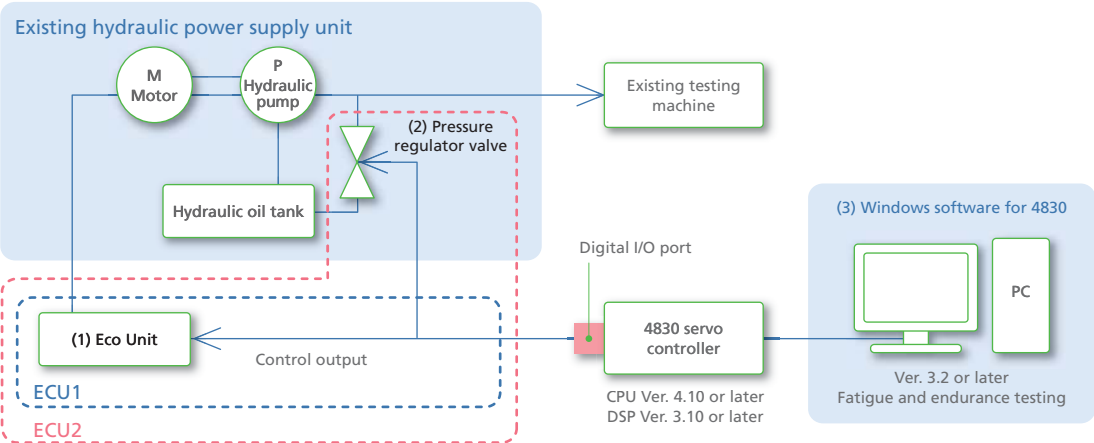
Power Savings with Energy-Saving Operation



Configuration of Eco Unit

ECU1: Controls the motor power supply frequency only (Configuration [1])

ECU2: Controls the motor power supply frequency and supply pressure (Configuration [1] and [2])



Note) The Eco Unit is operated by a 4830 servo controller. If the existing controller is not a 4830 servo controller, it must be upgraded. (See page 6 of the catalog.)

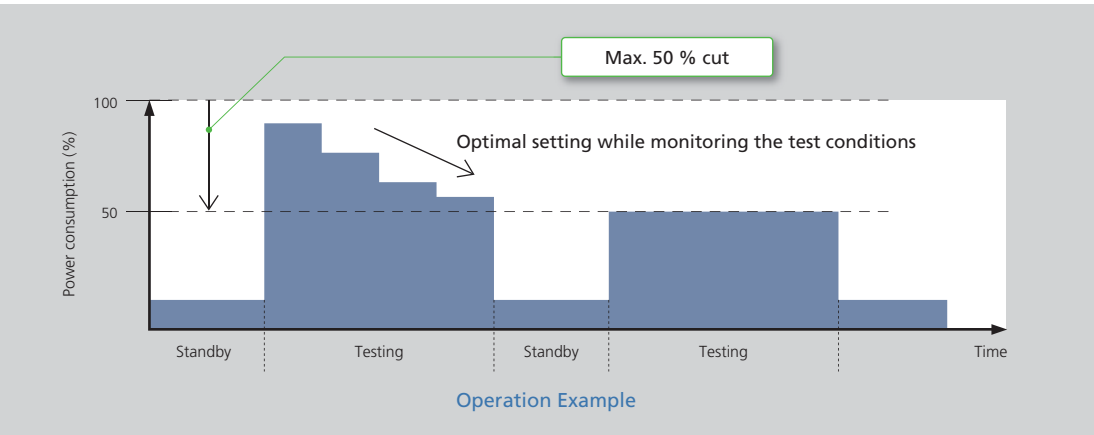
Note) The digital I/O port on the 4830 servo controller is used exclusively for the Eco Unit. The port cannot be used for other applications when the Eco Unit is connected.

Energy-Saving Operation

Automatic setting of the motor power supply frequency and supply pressure (ECU2 and Windows software)

Automatically performs energy-saving operation according to the test load and in standby status.

* If Windows software is not used, the setting can be made manually with the 4830 servo controller.

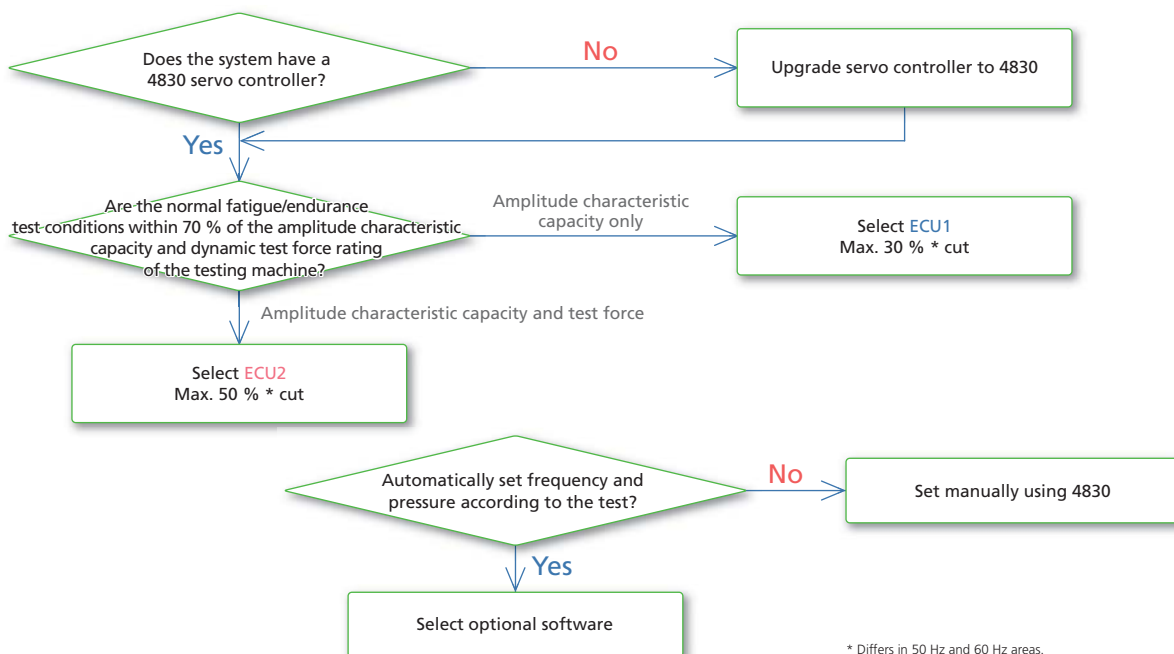


	Motor power supply frequency	Supply pressure
Standby	35 Hz	7-9 MPa
Before test	Automatic setting according to test conditions	
During test	The displacement amplitude and test force are periodically checked to automatically set the appropriate rotational speed or supply pressure.	

Note) When the function to automatically set the motor power supply frequency and supply pressure is used, the test conditions cannot be changed during a test.

Energy-Saving Effect

1. Selecting the model



2. Energy-Saving Effect (Table below shows the energy-saving effect at 50 % capacity utilization.)

Table 1 Power savings from installing ECU series unit in 60 Hz area.

Target hydraulic power supply unit	Machine capacity / test conditions giving maximum energy-saving effect *1	Conditions	Power consumption (kW)	Power savings (kW) A	Annual power savings (kWh) B *2	Energy saving rate (%)
AF-10B QF-10A QF-10B	[5 kN] / 3.5 kN, 10 Hz ±6.9 mm max. [10 kN] / 7 kN, 10 Hz ±3.6 mm max. [20 kN] / 14 kN, 10 Hz ±1.5 mm max. [50 kN] / 35 kN, 5 Hz ±1.2 mm max.	Not installed	6.2	—	—	—
		ECU1	3.6	2.6	11,388	42 %
		ECU2	2.6	3.6	15,768	58 %
AF-20B QF-20A QF-20B	[50 kN] / 35 kN, 10 Hz ±1.5 mm max. [100 kN] / 70 kN, 5 Hz ±1.2 mm max. [200 kN] / 140 kN, 2 Hz ±1.4 mm max.	Not installed	12.1	—	—	—
		ECU1	7.4	4.7	20,586	39 %
		ECU2	5.4	6.7	29,346	55 %
QF-40A QF-40B	[50 kN] / 35 kN, 10 Hz ±3.6 mm max. [100 kN] / 70 kN, 10 Hz ±1.4 mm max. [200 kN] / 140 kN, 5 Hz ±1.4 mm max.	Not installed	24.7	—	—	—
		ECU1	14.9	9.8	42,924	40 %
		ECU2	10.9	13.8	60,444	56 %
QF-70A QF-70B	[50 kN] / 35 kN, 10 Hz ±6.0 mm max. [100 kN] / 70 kN, 10 Hz ±2.5 mm max. [200 kN] / 140 kN, 10 Hz ±1.1 mm max.	Not installed	38.8	—	—	—
		ECU1	23.4	15.4	67,452	40 %
		ECU2	17.6	21.2	92,856	55 %

Table 2 Power savings from installing ECU series unit in 50 Hz area.

Target hydraulic power supply unit	Machine capacity / test conditions giving maximum energy-saving effect *1	Conditions	Power consumption (kW)	Power savings (kW) A	Annual power savings (kWh) B *2	Energy saving rate (%)
AF-10B QF-10A QF-10B	[5 kN] / 3.5 kN, 10 Hz ±6.9 mm max. [10 kN] / 7 kN, 10 Hz ±3.6 mm max. [20 kN] / 14 kN, 10 Hz ±1.5 mm max. [50 kN] / 35 kN, 5 Hz ±1.2 mm max.	Not installed	5.0	—	—	—
		ECU1	3.6	1.4	6,132	28 %
		ECU2	2.6	2.4	10,512	48 %
AF-20B QF-20A QF-20B	[50 kN] / 35 kN, 10 Hz ±1.5 mm max. [100 kN] / 70 kN, 5 Hz ±1.2 mm max. [200 kN] / 140 kN, 2 Hz ±1.4 mm max.	Not installed	10.1	—	—	—
		ECU1	7.4	2.7	11,826	27 %
		ECU2	5.4	4.7	20,586	47 %
QF-40A QF-40B	[50 kN] / 35 kN, 10 Hz ±3.6 mm max. [100 kN] / 70 kN, 10 Hz ±1.4 mm max. [200 kN] / 140 kN, 5 Hz ±1.4 mm max.	Not installed	20.4	—	—	—
		ECU1	14.9	5.5	24,090	27 %
		ECU2	10.9	9.5	41,610	47 %
QF-70A QF-70B	[50 kN] / 35 kN, 10 Hz ±6.0 mm max. [100 kN] / 70 kN, 10 Hz ±2.5 mm max. [200 kN] / 140 kN, 10 Hz ±1.1 mm max.	Not installed	31.6	—	—	—
		ECU1	23.4	8.2	35,916	26 %
		ECU2	17.6	14.0	61,320	44 %

*1 Conditions with latest standard model.

*2 Annual power savings B = A × 365 × 24 × 0.5 (calculated at 50 % capacity utilization)

ECU1/ECU2 Series

Energy-Conservation Unit for Shimadzu Servopulser Hydraulic Power Supply Unit

Specifications

1) Hardware specifications

Model	ECU1 Series (Motor Power Supply Frequency)	ECU2 Series (Motor Power Supply Frequency / Pressure)
Variable motor power supply frequencies *	35 / 38 / 41 / 44 / 47 / 50 / 55 / 60 Hz	
Variable pressure range	–	0-2 / 7-9 / 14-16 / 16-18 / 18-20 / 21 MPa

* 50 Hz max. in 50 Hz areas.

Support for water-cooled hydraulic power supply units (QF Series water-cooled hydraulic power supply units)

Type	ECU1-010	ECU2-010	ECU1-020	ECU2-020	ECU1-040	ECU2-040	ECU1-070	ECU2-070
P/N 348-58216-xx *	-01	-11	-02	-12	-03	-13	-04	-14
Applicable hydraulic power supply unit (water-cooled)	QF-10B		QF-20B		QF-40B		QF-70B	
Motor capacity	5.5 kW		11 kW		22 kW		37 kW	
Remote frequency setting	○	○	○	○	○	○	○	○
Remote hydraulic pressure setting	–	○	–	○	–	○	–	○
Size	W600 × D250 × H520 mm				W700 × D250 × H620 mm		W830 × D250 × H720 mm	
Weight	Approx. 25 kg		Approx. 30 kg		Approx. 50 kg		Approx. 60 kg	
Power supply capacity (for existing motor power supply)	3-phase, 200 V, 8 kVA Single-phase, 100 V, 1.5 kVA		3-phase, 200 V, 16 kVA Single-phase, 100 V, 1.5 kVA		3-phase, 200 V, 32 kVA Single-phase, 100 V, 1.5 kVA		3-phase, 200 V, 47 kVA Single-phase, 100 V, 1.5 kVA	

* P/N differs for retrofitting to existing product. Contact Shimadzu for further details.

Support for air-cooled hydraulic power supply units (AF Series air-cooled hydraulic power supply units)

Type	ECU1-A10	ECU2-A10	ECU1-A20	ECU2-A20
P/N 348-58216-xx *	-07	-17	-08	-18
Applicable hydraulic power supply unit (air-cooled)	AF-10B		AF-20B	
Motor capacity	5.5 kW		11 kW	
Remote frequency setting	○	○	○	○
Remote hydraulic pressure setting	–	○	–	○
Size	W600 × D250 × H520 mm			
Weight	Approx. 25 kg		Approx. 30 kg	
Power supply capacity (for existing motor power supply)	3-phase, 200 V, 8 kVA Single-phase, 100 V, 1.5 kVA		3-phase, 200 V, 17 kVA Single-phase, 100 V, 1.5 kVA	

* P/N differs for retrofitting to existing product. Contact Shimadzu for further details.

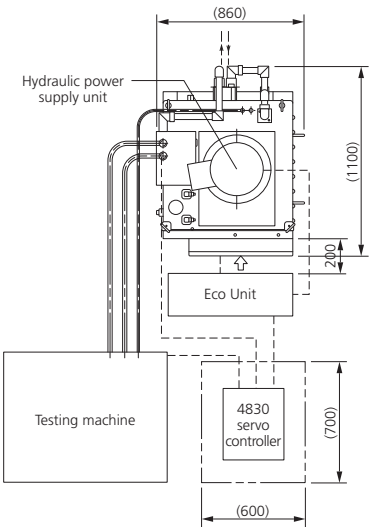
2) Optional software specifications

Software		Windows software for 4830 (P/N: 347-39703)
OS		Windows XP / Windows Vista / Windows 7
Applicable testing	Motor frequency / supply pressure setting (manual)	Permits settings for overall testing
	Motor frequency / supply pressure setting (automatic)	Fatigue/endurance testing (sine wave, haversine wave, triangular wave, havertriangular wave)

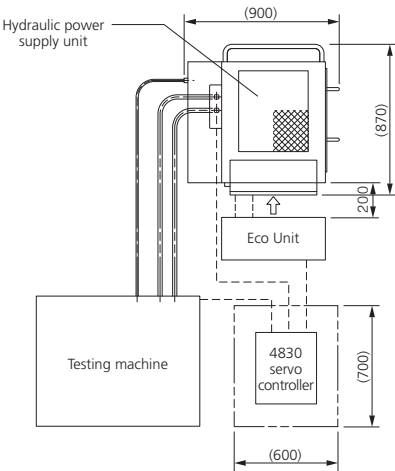
* GLUON 4830 software is not supported. (Set supply pressure and motor frequency from 4830 servo controller.)

Layout Diagram (Example)

Units: mm



Layout with QF-40 hydraulic power supply unit



Layout with AF-20 hydraulic power supply unit

ECU1/ECU2 Series

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4830 Servo Controller



Features

Push test function for testing actual objects

Allows stable peak-value control using the test force, even for specimens with "play" (areas where no test force is applied).

Enhanced stability

Features overload prevention for manual operation and upthrust prevention, which that works when a hydraulic power supply unit starts up (automatically sets control error to zero).

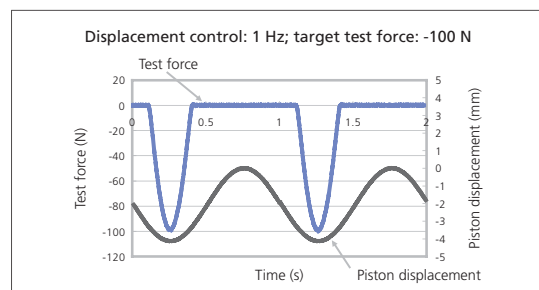
Superb operability

Test conditions, including test frequency, test force, and displacement, can be set via a touch panel or jog dial and changed at any time during the test. Intuitive screen displays allow operation without referring to the manual.

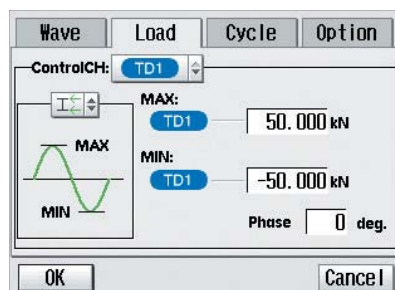
Highly versatile

Allows synchronous control of up to four testing machines (actuators). Featured diverse waveform displays, including X-T, X-Y, and peak graphs. USB connection to a computer permits various test settings and advanced data acquisition.

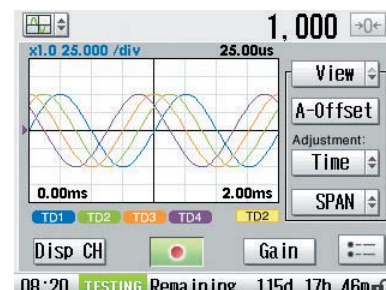
Push test



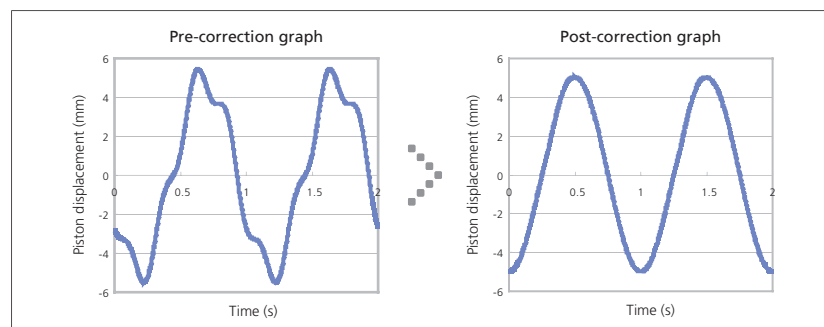
Load condition settings



Waveform display function



Waveform distortion correction



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JQA-0376



SHIMADZU CORPORATION. International Marketing Division

3. Kanda-Nishikicho 1-chome, Chiyoda-ku, Tokyo 101-8448, Japan

Phone: 81(3)3219-5641 Fax: 81(3)3219-5710

URL <http://www.shimadzu.com>

Printed in Japan 4199-06101-30AIK

The contents of this brochure are subject to change without notice.