

mitsubishi electric
HYDRONICS & IT COOLING SYSTEMS S.p.A.

COMFORT

CHILLERS

WATER COOLED CHILLER RANGE

**SCREW COMPRESSORS WITH
R513A REFRIGERANT**

r R513A



DELIVERING THE BEST VALUE TO YOUR COMFORT APPLICATION



Today comfort applications are driven by new demands for low ecological footprint HVAC systems, able to reduce the greenhouse effect while ensuring high efficiency values.

Fully committed to supporting the creation of a greener tomorrow, Mitsubishi Electric presents a complete range of water cooled screw compressor chillers optimized for the use of R513A, the innovative low GWP refrigerant that ensures top-level chiller performance and a completely reliable usage.

COMFORT APPLICATIONS

- ✓ Commercial premises
- ✓ Office buildings
- ✓ Hotels and resorts
- ✓ Healthcare facilities
- ✓ Retail and department stores
- ✓ Sports and leisure installations

2 EVAPORATING TECHNOLOGIES

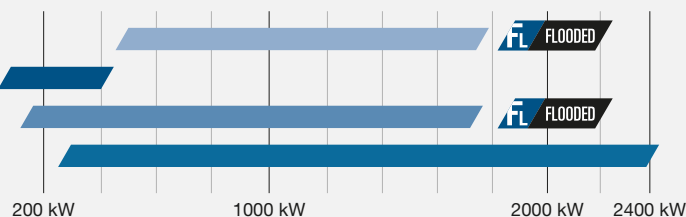
T SHELL&T.

Two types of heat exchangers to achieve premium levels of efficiency at both full and partial loads.

FL FLOODED

A COMPLETE RANGE FROM 124 kW TO 2 MW

i-FX-W(1+i)-G05
FX-W-G05
FOCS3-W-G05
FOCS2-W-G05



HEAT RECOVERY SYSTEM AVAILABLE



For recovering heat when both hot and cold water are required.

THE BEST COMPRESSOR COMBINATION

(1+i)

Two compressor technologies that can offer the best efficiency according to the real thermal loads.

INNOVATIVE 1+i INVERTER TECHNOLOGY

1 Fixed speed compr. + i Variable Speed Compr.



MANY INSTALLATION OPPORTUNITIES

i-FX-W(1+i)-G05	531-1778 kW	<ul style="list-style-type: none"> ✓ Inverter driven compressor ✓ Unbeatable efficiency both at full and partial loads ✓ Compact design 	Ideal for medium-large applications
FX-W-G05	124-399 kW	<ul style="list-style-type: none"> ✓ High efficiency ✓ Heat recovery system available 	Ideal for small-medium size applications
FOCS3-W-G05	188-1688 kW	<ul style="list-style-type: none"> ✓ Extremely small footprint ✓ Very high efficiency 	Ideal for medium applications
FOCS2-W-G05	305-2410 kW	<ul style="list-style-type: none"> ✓ High configurability ✓ Wide choice of accessories ✓ Wide range > from 1 to 4 compressor units ✓ Low sound levels > several enclosures available 	Ideal for medium-large applications

ALL-ROUND SUSTAINABILITY



The new screw compressor chiller range with R513A refrigerant is the result of Mitsubishi Electric Hydronics & IT Cooling Systems' extensive approach to sustainability.

Increasing concerns about the global warming impact of chillers and heat pumps is driving new regulatory policies to push towards even more efficient units with the lowest carbon footprint.

Today, an all-round approach is the only way to effectively reduce the Total Equivalent Warming Impact (TEWI).

Combining brilliant annual efficiency with the use of a low GWP refrigerant, the Climaveneta branded range of chillers with R513A tackles both indirect (due to primary energy consumption) and direct global warming, thus resulting in the perfect choice for any new, forward-looking cooling system.



-56% GWP
vs R134a



Non-flammable
Safety Class A1

New generation refrigerant with reduced greenhouse effect. Non-flammable.

Reduced GWP

R513A GWP_{100 year} = 572
(R134a GWP_{100 year} = 1300)
GWP values according to IPCC AR5

Non-toxic, non-flammable

ASHRAE 34, ISO 817: A1 class

Favorable physical properties

Same cooling capacity delivered as R134a
Same operating pressures as R134a

In line with standard building codes

No special equipment
No need for flammable risk assessment
No extra costs

Compliant with eco regulation objectives

No future retrofit required
Reduced price volatility

REFRIGERANT BENCHMARK

SCROLL			SCREW		
Refrigerant	GWP*	Flammability**	Refrigerant	GWP*	Flammability**
R410A	2088	NON flammable	R134a	1430	NON flammable
R32	675	MILDLY flammable	R513A	631	NON flammable
R454B	466	MILDLY flammable	R1234ze	7	MILDLY flammable
R452B	698	MILDLY flammable	R1234yf	4	MILDLY flammable

New regulations like the EU F-gas and the Kigali Amendment to the Montreal Protocol, are driving the industry towards new eco-friendly refrigerants, with reduced greenhouse effect.

Unfortunately, the majority of low GWP refrigerants raises another critical issue: flammability.

The new refrigerant R513A, chosen for the water cooled chiller range, is a brilliant exception: it offers a -56% GWP reduction compared to R134a's while ensuring complete non-toxicity and non-flammability (Class A1 of ASHRAE 34, ISO 817).

*IPCC AR4 **ASHRAE 34 - ISO 817

FOCS2-W-G05

WATER COOLED CHILLER AND HEAT PUMP WITH SCREW COMPRESSORS AND SHELL AND TUBE CONDENSER 305-2410 kW

Ideal solution for medium and large size applications, the FOCS2-W-G05 series features a wide cooling capacity from 305 to 2410 kW and units from one to four compressors.

All the units offers precise and accurate thermoregulation, easily adapting to different thermal load conditions. High performances are guaranteed thanks to the accurate sizing of all the components.



COUNTLESS INSTALLATION OPPORTUNITIES

FOCS2-W-G05 is available with a wide range of accessories and configurations. This high configurability is key to always delivering the most appropriate solution to customers, according to the plant requirements.

2 Efficiency Versions

- CA high efficiency
- CA-E Class A version

3 Heat Recovery Configurations

FOCS2-W-G05 chillers will save money not only when the unit is producing cooling. It also offers the opportunity to recover heat when there is a simultaneous need for chilled and hot water by redirecting this heat from the chiller to various heating applications:

- ✓ **Restaurants, hotels, resorts, hospitals, residential buildings:** hot water can be used for the kitchen, laundry and bathrooms.
- ✓ **Schools, sports facilities and Spas:** showers, washrooms and swimming pool heating.
- ✓ **Offices or residential buildings:** radiant floor heating and restrooms.

3 Acoustic Configurations

-	Standard unit	Baseline
-	Standard unit +Enclosure (Base) realized with peraluman panels lined with an acoustic insulation made by polyester fiber of thickness 30 mm.	-14 dB(A)
-	Standard unit +Enclosure (Plus) realized with peraluman panels lined with a special acoustic insulation composed by 5 alternating layers of polyurethane and gaiter of total thickness 50 mm.	-18 dB(A)



-	Standard unit	Unit for the production of chilled water.	Baseline
D	Partial heat recovery	A desuperheater on the compressor discharge line recovers approximately 20% of the unit's capacity.	60°C
R	Total heat recovery	A devoted refrigerant water heat exchanger recovers all the condensation heat.	50°C
H	Heat pump reversible on the hydraulic side		



FOCS2-W-G05 /CA			1301	1401	3202	3602	4202	4502	4802	5402	6002	8103	9003	9004	9604
Power supply	V/ph/Hz		400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
PERFORMANCE															
COOLING ONLY (GROSS VALUE)															
Cooling capacity	(1)	kW	306,0	348,3	843,9	957,3	1071	1145	1213	1348	1490	2024	2236	2278	2416
Total power input	(1)	kW	63,01	71,59	173,7	196,7	220,5	235,6	249,9	278,1	307,4	417,3	460,6	469,7	498,3
EER	(1)	kW/kW	4,857	4,865	4,858	4,867	4,857	4,860	4,854	4,847	4,847	4,850	4,855	4,850	4,848
ESEER	(1)	kW/kW	5,820	5,830	5,870	6,140	6,080	6,170	6,170	6,010	6,090	5,970	6,010	6,110	6,050
COOLING ONLY (EN14511 VALUE)															
Cooling capacity	(1)(2)	kW	304,9	347,0	841,1	954,1	1069	1142	1210	1344	1485	2018	2228	2273	2410
EER	(1)(2)	kW/kW	4,670	4,680	4,690	4,700	4,720	4,720	4,710	4,690	4,680	4,710	4,700	4,730	4,720
ESEER	(1)(2)	kW/kW	5,340	5,350	5,400	5,620	5,660	5,720	5,690	5,540	5,560	5,500	5,500	5,680	5,600
Cooling energy class			B	B	B	B	B	B	B	B	B	B	B	B	B
ENERGY EFFICIENCY															
SEASONAL EFFICIENCY IN COOLING (Reg. EU 2016/2281)															
Ambient refrigeration															
Prated,c	(7)	kW	305	347	841	954	1069	1142	1210	1344	1485	-	-	-	-
SEER	(7)(8)		5,44	5,46	5,88	5,88	5,88	5,90	5,88	5,88	5,88	-	-	-	-
Performance ηs	(7)(9)	%	210	211	227	227	227	228	227	227	227	-	-	-	-
EXCHANGERS															
HEAT EXCHANGER USER SIDE IN REFRIGERATION															
Water flow	(1)	l/s	14,64	16,66	40,35	45,78	51,23	54,74	58,02	64,47	71,27	96,81	106,9	108,9	115,5
Pressure drop	(1)	kPa	41,9	45,0	45,4	46,4	30,6	34,2	38,4	47,4	54,6	43,7	53,3	32,3	36,3
HEAT EXCHANGER SOURCE SIDE IN REFRIGERATION															
Water flow	(1)	l/s	17,57	20,00	48,46	54,95	61,51	65,73	69,67	77,44	85,60	116,3	128,4	130,8	138,8
Pressure drop	(1)	kPa	36,4	35,4	35,3	35,2	34,8	35,8	36,5	35,0	37,0	35,0	36,3	35,5	37,4
REFRIGERANT CIRCUIT															
Compressors nr.		N°	1	1	2	2	2	2	2	2	2	3	3	4	4
No. Circuits		N°	1	1	2	2	2	2	2	2	2	3	3	4	4
NOISE LEVEL															
Sound Pressure	(3)	dB(A)	79	79	80	80	80	80	80	82	82	82	82	82	82
Sound power level in cooling	(4)(5)	dB(A)	97	97	99	99	99	99	99	101	101	102	102	102	102
SIZE AND WEIGHT															
Length	(6)	mm	3830	3830	4750	4750	4750	4750	4750	4850	4850	4950	4950	4650	4650
Width	(6)	mm	900	900	1150	1150	1150	1150	1150	1150	1150	1700	1700	2250	2250
Height	(6)	mm	1700	1700	2050	2050	2200	2200	2200	2200	2200	2150	2150	2230	2230
Operating weight	(6)	kg	2050	2110	5110	5400	6070	6120	6180	6950	7090	10170	10350	14330	14390

Notes:

- Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger water (in/out) 30°C/35°C.
- Values in compliance with EN14511-3.
- Average sound pressure level at 1m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
- Sound power on the basis of measurements made in compliance with ISO 9614.
- Sound power level in cooling, indoors.

6 Unit in standard configuration/execution, without optional accessories.

7 Parameter calculated according to [REGULATION (EU) N. 2016/2281]

8 Seasonal energy efficiency ratio

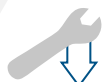
9 Seasonal space cooling energy efficiency

The units highlighted in this publication contain R513A [GWP₁₀₀ 631] fluorinated greenhouse gases.

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**EASY ADAPTABILITY**

Maximum adaptability to the needs of the plant thanks to the continuous modulation of the cooling capacity and the precision in the control logics.

**FLEXIBLE INSTALLATION**

The compact and essential design leads to more flexibility during the design phase, both in the case of new plants and preexisting ones, in addition to a greater ease of handling and on site positioning in plants with reduced space.

**EXTREMELY SILENT OPERATION**

The FOCS2-W-G05 family offers the widest variability in terms of sound levels. Thanks to a variety of accessories from the 50 mm thick fiber-form soundproofing insulation to the external casing, FOCS2-W-G05 is able to further reduce the sound levels of 18 dB(A).



FOCS2-W-G05

Water cooled chiller and heat pump with screw compressors and shell and tube condenser
305-2410 kW.

FOCS2-W-G05 /CA-E			1301	1401	1601	1801	2101	2401	2802	3202	3602
Power supply		V/ph/Hz		400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
PERFORMANCE											
COOLING ONLY (GROSS VALUE)											
Cooling capacity	(1)	kW	320,7	364,7	441,9	506,3	573,7	649,4	729,4	884,2	1012
Total power input	(1)	kW	59,70	67,84	82,38	94,07	106,9	121,0	135,8	164,8	187,9
EER	(1)	kW/kW	5,372	5,379	5,363	5,380	5,367	5,367	5,371	5,365	5,386
ESEER	(1)	kW/kW	6,370	6,370	6,300	6,390	6,380	6,400	6,520	6,440	6,600
COOLING ONLY (EN14511 VALUE)											
Cooling capacity	(1)(2)	kW	319,5	363,3	440,0	504,2	571,4	646,5	726,6	880,5	1009
EER	(1)(2)	kW/kW	5,110	5,120	5,090	5,110	5,100	5,090	5,130	5,110	5,170
ESEER	(1)(2)	kW/kW	5,710	5,720	5,630	5,720	5,710	5,700	5,850	5,720	5,940
Cooling energy class			A	A	A	A	A	A	A	A	A
ENERGY EFFICIENCY											
SEASONAL EFFICIENCY IN COOLING (Reg. EU 2016/2281)											
Ambient refrigeration											
Prated,c	(7)	kW	320	363	440	504	571	646	727	880	1009
SEER	(7)(8)		5,75	5,78	5,88	5,88	5,88	5,88	6,04	5,96	6,17
Performance η_s	(7)(9)	%	222	223	227	227	227	227	233	230	239
EXCHANGERS											
HEAT EXCHANGER USER SIDE IN REFRIGERATION											
Water flow	(1)	l/s	15,33	17,44	21,13	24,21	27,44	31,06	34,88	42,28	48,41
Pressure drop	(1)	kPa	45,7	47,7	53,5	53,4	52,8	60,2	51,9	58,6	41,3
HEAT EXCHANGER SOURCE SIDE IN REFRIGERATION											
Water flow	(1)	l/s	18,13	20,62	24,99	28,62	32,44	36,72	41,24	49,99	57,20
Pressure drop	(1)	kPa	49,0	47,2	52,2	53,3	55,0	57,0	47,2	52,1	53,4
REFRIGERANT CIRCUIT											
Compressors nr.		N°	1	1	1	1	1	1	2	2	2
No. Circuits		N°	1	1	1	1	1	1	2	2	2
NOISE LEVEL											
Sound Pressure	(3)	dB(A)	79	78	78	78	78	78	80	80	80
Sound power level in cooling	(4)(5)	dB(A)	97	97	97	97	97	97	99	99	99
SIZE AND WEIGHT											
A	(6)	mm	4250	4250	4150	4150	4130	4350	4550	4950	5170
B	(6)	mm	900	900	900	900	900	900	1150	1150	1150
H	(6)	mm	1815	1910	1990	1990	1990	2090	2050	2200	2200
Operating weight	(6)	kg	2470	2770	3570	3750	3790	4230	5390	6460	6920

Notes:

- Plant (side) cooling exchanger water (in/out) 12°C/7°C;
Source (side) heat exchanger water (in/out) 30°C/35°C.
- Values in compliance with EN14511-3.
- Average sound pressure level at 1m distance, unit in a free field on a reflective surface;
non-binding value calculated from the sound power level.
- Sound power on the basis of measurements made in compliance with ISO 9614.
- Sound power level in cooling, indoors.

6 Unit in standard configuration/execution, without optional accessories.

7 Parameter calculated according to [REGULATION (EU) N. 2016/2281]

8 Seasonal energy efficiency ratio

9 Seasonal space cooling energy efficiency

The units highlighted in this publication contain R513A [GWP₁₀₀ 631] fluorinated greenhouse gases.

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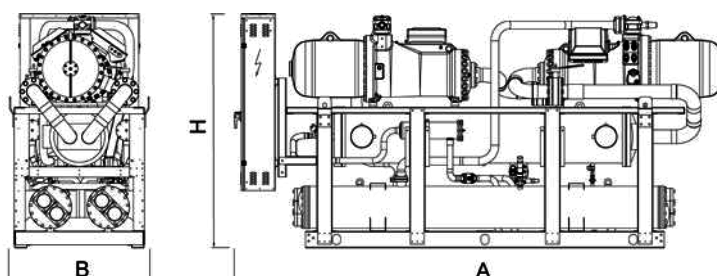
FOCS2-W-G05 /CA-E			4202	4802	2701	3001	5402	7204	7804	8404
Power supply		V/ph/Hz		400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
PERFORMANCE										
COOLING ONLY (GROSS VALUE)										
Cooling capacity	(1)	kW	1147	1299	706,7	781,3	1411	2025	2157	2294
Total power input	(1)	kW	213,8	242,0	133,2	146,9	266,3	375,9	401,7	427,5
EER	(1)	kW/kW	5,365	5,368	5,306	5,319	5,299	5,387	5,370	5,366
ESEER	(1)	kW/kW	6,520	6,530	6,380	6,400	6,540	6,620	6,510	6,520
COOLING ONLY (EN14511 VALUE)										
Cooling capacity	(1)(2)	kW	1143	1293	704,0	778,6	1407	2019	2149	2286
EER	(1)(2)	kW/kW	5,120	5,110	5,060	5,090	5,090	5,190	5,140	5,140
ESEER	(1)(2)	kW/kW	5,800	5,750	5,750	5,810	5,890	6,020	5,830	5,860
Cooling energy class			A	A	A	A	A	A	A	A
ENERGY EFFICIENCY										
SEASONAL EFFICIENCY IN COOLING (Reg. EU 2016/2281)										
Ambient refrigeration										
Prated,c	(7)	kW	1143	1293	704	779	1407	-	-	-
SEER	(7)(8)		6,04	6,03	5,88	5,88	6,09	-	-	-
Performance η_s	(7)(9)	%	234	233	227	227	236	-	-	-
EXCHANGERS										
HEAT EXCHANGER USER SIDE IN REFRIGERATION										
Water flow	(1)	l/s	54,85	62,10	33,80	37,36	67,48	96,82	103,2	109,7
Pressure drop	(1)	kPa	55,0	65,0	51,5	47,2	46,0	41,3	59,3	54,6
HEAT EXCHANGER SOURCE SIDE IN REFRIGERATION										
Water flow	(1)	l/s	64,85	73,42	40,02	44,23	79,94	114,4	121,9	129,7
Pressure drop	(1)	kPa	55,0	57,3	52,3	49,9	52,2	52,6	54,0	54,5
REFRIGERANT CIRCUIT										
Compressors nr.		N°	2	2	1	1	2	4	4	4
No. Circuits		N°	2	2	1	1	2	4	4	4
NOISE LEVEL										
Sound Pressure	(3)	dB(A)	79	79	80	80	81	82	82	82
Sound power level in cooling	(4)(5)	dB(A)	99	99	99	99	101	102	102	102
SIZE AND WEIGHT										
A	(6)	mm	4920	4920	4350	4350	5200	5220	4900	4900
B	(6)	mm	1150	1285	900	900	1285	2250	2250	2250
H	(6)	mm	2350	2430	2180	2180	2440	2305	2455	2455
Operating weight	(6)	kg	7900	8560	4760	4870	8850	13720	15850	16100

Notes:

- 1 Plant (side) cooling exchanger water (in/out) 12°C/7°C;
Source (side) heat exchanger water (in/out) 30°C/35°C.
- 2 Values in compliance with EN14511-3.
- 3 Average sound pressure level at 1m distance, unit in a free field on a reflective surface;
non-binding value calculated from the sound power level.
- 4 Sound power on the basis of measurements made in compliance with ISO 9614.
- 5 Sound power level in cooling, indoors.

- 6 Unit in standard configuration/execution, without optional accessories.
 - 7 Parameter calculated according to [REGULATION (EU) N. 2016/2281]
 - 8 Seasonal energy efficiency ratio
 - 9 Seasonal space cooling energy efficiency
- The units highlighted in this publication contain R513A [GWP₁₀₀ 631] fluorinated greenhouse gases.

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for a greener tomorrow

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.



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