

**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

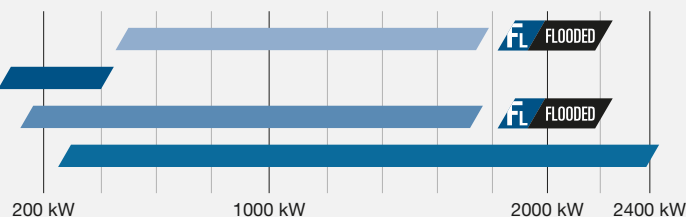
**T** SHELL&T.

**FL** FLOODED

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

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

# 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<sub>100 year</sub> = 572  
(R134a GWP<sub>100 year</sub> = 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

# FOCS3-W-G05

## WATER COOLED CHILLER WITH SCREW COMPRESSORS AND FLOODED EVAPORATOR. 188-1688 kW

FOCS3-W-G05 is the high efficiency screw compressor chiller featuring shell and tube condenser, flooded evaporator and electronic expansion valve.

Thanks to its vertical and compact design, the chiller can be easily installed in narrow spaces and can fit into most building layouts. High performances and premium efficiency are achieved thanks to the accurate sizing of all components and the precision in the control logics.



### UNPARALLELED EFFICIENCY



Thanks to the choice of high performing components, the FOCS3-W-G05 units are characterized by really competitive efficiency levels both at full and part loads (EER 5.16; SEER 6.23), which ensure minimum running costs and a quick return on investment.

### COMPACT DESIGN



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

### EASY ADAPTABILITY

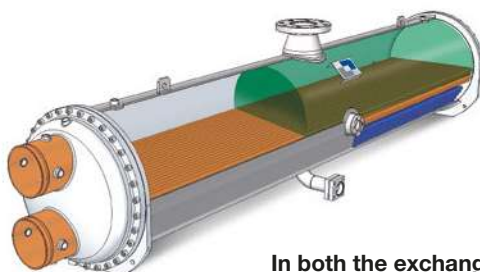


Maximum adaptability to the needs of the plant thanks to the continuous modulation of the cooling capacity and the precision in the control logics.

## INNOVATIVE DESIGN OF THE HEAT EXCHANGERS

The flooded evaporator and the shell and tube condenser, both fully designed and built internally, present an exclusive design aimed to maximize the cooling power and optimize the operation of the compressors.

In the evaporator the complete flooding of the tubes is also guaranteed during partial load conditions by an electronic expansion valve, managed by proprietary control logics. The shell and tube condenser is designed in order to guarantee reduced pressure drops on the water side and to decrease the pumping costs as much as possible.



In both the exchangers the presence of refrigerant fluid in the shell side and water in the tube side allows:

Minimization of pressure drops

Perfect unified temperature as well as complete refrigerant evaporation

Elimination of a surface dedicated to super-heating

Facilitation of cleaning operation



FOCS3-W-G05		0551	0701	0851	0951	1101	1301	1401	1651	1901	2101	2501
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
<b>PERFORMANCE</b>												
<b>COOLING ONLY (GROSS VALUE)</b>												
Cooling capacity	(1) kW	188,2	250,0	306,0	337,6	383,5	459,9	524,0	591,8	681,6	741,3	837,0
Total power input	(1) kW	36,40	47,78	58,45	63,77	72,73	85,99	96,90	108,2	127,0	138,7	155,6
EER	(1) kW/kW	5,170	5,230	5,231	5,292	5,275	5,348	5,408	5,470	5,367	5,345	5,379
ESEER	(1) kW/kW	6,910	7,150	6,560	6,830	6,800	6,730	7,250	6,960	7,020	6,920	6,800
<b>COOLING ONLY (EN14511 VALUE)</b>												
Cooling capacity	(1)(2) kW	187,4	248,9	304,7	336,1	381,9	458,2	522,3	589,5	679,4	738,9	834,3
EER	(1)(2) kW/kW	4,890	4,950	4,960	5,010	5,000	5,090	5,190	5,200	5,120	5,130	5,160
ESEER	(1)(2) kW/kW	6,180	6,370	5,950	6,150	6,140	6,140	6,670	6,310	6,390	6,400	6,280
Cooling energy class		B	B	B	B	B	A	A	A	A	A	A
<b>ENERGY EFFICIENCY</b>												
<b>SEASONAL EFFICIENCY IN COOLING (Reg. EU 2016/2281)</b>												
Ambient refrigeration												
Prated,c	(7) kW	187	249	305	336	382	458	522	590	679	739	834
SEER	(7)(8)	5,81	6,04	5,62	5,78	5,79	5,94	6,50	6,12	6,19	6,27	6,19
Performance ηs	(7)(9) %	224	234	217	223	223	230	252	237	240	243	240
<b>EXCHANGERS</b>												
<b>HEAT EXCHANGER USER SIDE IN REFRIGERATION</b>												
Water flow	(1) l/s	9,001	11,95	14,63	16,15	18,34	21,99	25,06	28,30	32,59	35,45	40,03
Pressure drop	(1) kPa	42,0	48,7	49,1	52,4	52,8	47,5	39,9	50,9	42,0	42,7	42,8
<b>HEAT EXCHANGER SOURCE SIDE IN REFRIGERATION</b>												
Water flow	(1) l/s	10,70	14,19	17,36	19,13	21,74	26,02	29,60	33,37	38,54	41,94	47,31
Pressure drop	(1) kPa	57,4	57,9	56,7	59,3	58,1	55,2	44,8	55,8	60,4	45,8	48,1
<b>REFRIGERANT CIRCUIT</b>												
Compressors nr.	N°	1	1	1	1	1	1	1	1	1	1	1
No. Circuits	N°	1	1	1	1	1	1	1	1	1	1	1
<b>NOISE LEVEL</b>												
Sound Pressure	(3) dB(A)	77	77	80	80	80	80	80	80	80	82	82
Sound power level in cooling	(4)(5) dB(A)	95	95	98	98	98	98	98	98	98	100	100
<b>SIZE AND WEIGHT</b>												
Length	(6) mm	2920	2920	2920	2920	2920	2900	2900	2900	2930	2980	2990
Width	(6) mm	1180	1180	1180	1180	1180	1180	1180	1180	1180	1190	1280
Height	(6) mm	1870	1870	1870	1870	1870	1960	1970	1960	2050	2100	2200
Operating weight	(6) kg	1740	1790	2170	2200	2260	2940	3020	3150	3270	3570	3960

FOCS3-W-G05		2602	3002	3152	3502	3652	4002	4102	4502	4602	4752	
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	
<b>PERFORMANCE</b>												
<b>COOLING ONLY (GROSS VALUE)</b>												
Cooling capacity	(1) kW	915,9	1062	1140	1218	1303	1382	1450	1522	1614	1693	
Total power input	(1) kW	171,0	194,8	204,3	222,9	234,1	251,9	263,1	279,3	295,9	304,3	
EER	(1) kW/kW	5,356	5,452	5,580	5,464	5,566	5,486	5,511	5,449	5,455	5,564	
ESEER	(1) kW/kW	7,060	7,330	7,530	7,150	7,400	7,130	7,200	7,190	7,230	7,500	
<b>COOLING ONLY (EN14511 VALUE)</b>												
Cooling capacity	(1)(2) kW	913,2	1058	1137	1214	1299	1377	1445	1517	1609	1688	
EER	(1)(2) kW/kW	5,160	5,210	5,400	5,220	5,380	5,250	5,290	5,210	5,240	5,320	
ESEER	(1)(2) kW/kW	6,400	6,480	6,870	6,330	6,740	6,350	6,450	6,410	6,500	6,660	
Cooling energy class		A	A	A	A	A	A	A	A	A	A	
<b>ENERGY EFFICIENCY</b>												
<b>SEASONAL EFFICIENCY IN COOLING (Reg. EU 2016/2281)</b>												
Ambient refrigeration												
Prated,c	(7) kW	913	1058	1137	1214	1299	1377	1445	1517	1609	1688	
SEER	(7)(8)	6,28	6,37	6,89	6,24	6,76	6,30	6,50	6,34	6,41	6,62	
Performance ηs	(7)(9) %	243	247	267	242	262	244	252	246	248	257	
<b>EXCHANGERS</b>												
<b>HEAT EXCHANGER USER SIDE IN REFRIGERATION</b>												
Water flow	(1) l/s	43,80	50,79	54,53	58,23	62,33	66,11	69,33	72,76	77,20	80,94	
Pressure drop	(1) kPa	40,0	51,5	37,4	51,4	39,8	50,4	46,7	51,5	42,5	46,7	
<b>HEAT EXCHANGER SOURCE SIDE IN REFRIGERATION</b>												
Water flow	(1) l/s	51,80	59,91	64,10	68,67	73,30	77,91	81,66	85,84	91,05	95,19	
Pressure drop	(1) kPa	44,5	54,4	32,0	56,8	34,1	53,5	50,1	55,4	53,7	58,7	
<b>REFRIGERANT CIRCUIT</b>												
Compressors nr.	N°	2	2	2	2	2	2	2	2	2	2	
No. Circuits	N°	2	2	2	2	2	2	2	2	2	2	
<b>NOISE LEVEL</b>												
Sound Pressure	(3) dB(A)	81	81	81	81	81	81	82	82	82	82	
Sound power level in cooling	(4)(5) dB(A)	100	100	100	100	100	100	101	102	102	102	
<b>SIZE AND WEIGHT</b>												
Length	(6) mm	4430	4430	4440	4470	4470	4470	4565	4650	5270	5270	
Width	(6) mm	1270	1270	1270	1270	1320	1270	1320	1320	1320	1320	
Height	(6) mm	2210	2210	2280	2250	2330	2280	2380	2380	2380	2380	
Operating weight	(6) kg	6200	6430	7080	7160	7560	7280	7850	7940	8420	8950	

**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 [GWP<sub>100</sub> 631] fluorinated greenhouse gases****Certified data in EUROVENT**



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.



## mitsubishi electric hydronics & it cooling systems S.p.A.

Head Office: Via Caduti di Cefalonia 1 - 36061 Bassano del Grappa (VI) - Italy

Tel (+39) 0424 509 500 - Fax (+39) 0424 509 509

[www.climaveneta.com](http://www.climaveneta.com)

[www.melcohit.com](http://www.melcohit.com)