Scotsman®
Ice Systems

NEW COMPACT SERIES

SCALE ICE MAKERS

SERVICE TRAINING

Welcome to SCOTSMAN Mar series service training for
MAR 56, MAR 76, MAR 106, MAR 126,MAR 206 e MAR 306.

rev. 02-2017

Scotsman®
Ice Systems

NEW COMPACT SERIES

MAR 56 AS/WS

Production max:

380 Kg/24h scale thickness = 2 mm

426 Kg/24h scale thickness = 1 mm

MAR 76 AS/WS

Production max:

510 Kg/24h scale thickness = 2 mm

570 Kg/24h scale thickness = 1 mm

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NEW COMPACT SERIES

Model MAR 106 AS/WS

Production max:

700 Kg/24h scale thickness = 2 mm

785 Kg/24h scale thickness = 1 mm

Model MAR 126 AS/WS

Production max:

1000 Kg/24h scale thickness = 2 mm

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NEW COMPACT SERIES

MAR 206 AS/WS

Production max:

1650 Kg/24h scale thickness = 2 mm

1850 Kg/24h scale thickness = 1 mm

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NEW COMPACT SERIES

MAR 306 ASR /WS

Production max:

2200 Kg/24h scale thickness = 2 mm

2465 Kg/24h scale thickness = 1 mm

Remote Condenser

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NEW COMPACT SERIES

Ice chute supplied with MAR series

- COVERMARS

(MAR 56-76-106-126)

- COVERMARL

(MAR 206-306)

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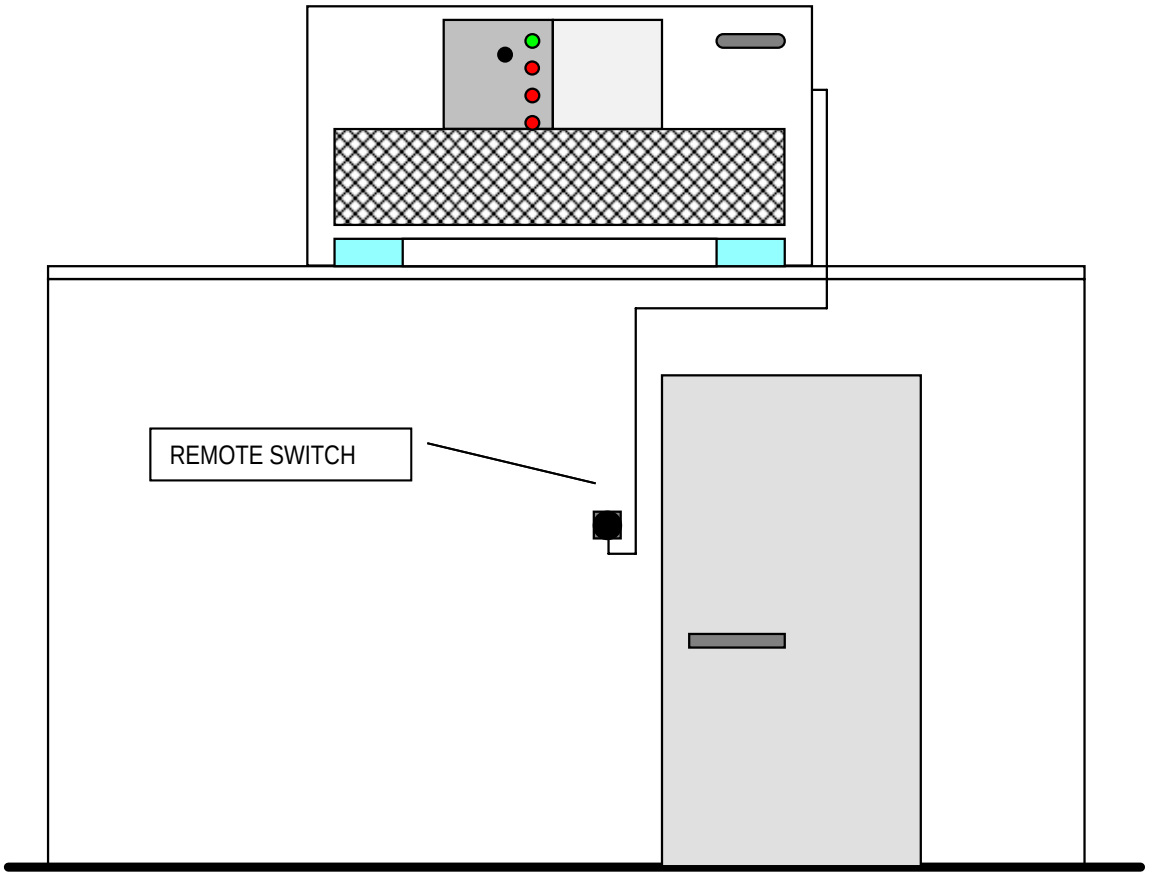
Ice Systems

NEW COMPACT SERIES

Scotsman® Ice Systems

NEW COMPACT SERIES

Further MAR series installation, apart stacking on bin is on top of storing room



Scotsman® Ice Systems

NEW COMPACT SERIES

CONTENITORE o CELLA REFRIGERATA

ICE Volume - Weight : 2.0 m^3/ton

Short time ice storing:

not refrigerated room with capacity of 2/3 of ice maker daily capacity

Long time ice storing:

refrigerated room with twice ice maker daily capacity and inside temperature of -6°C

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Ice Systems

NEW COMPACT SERIES

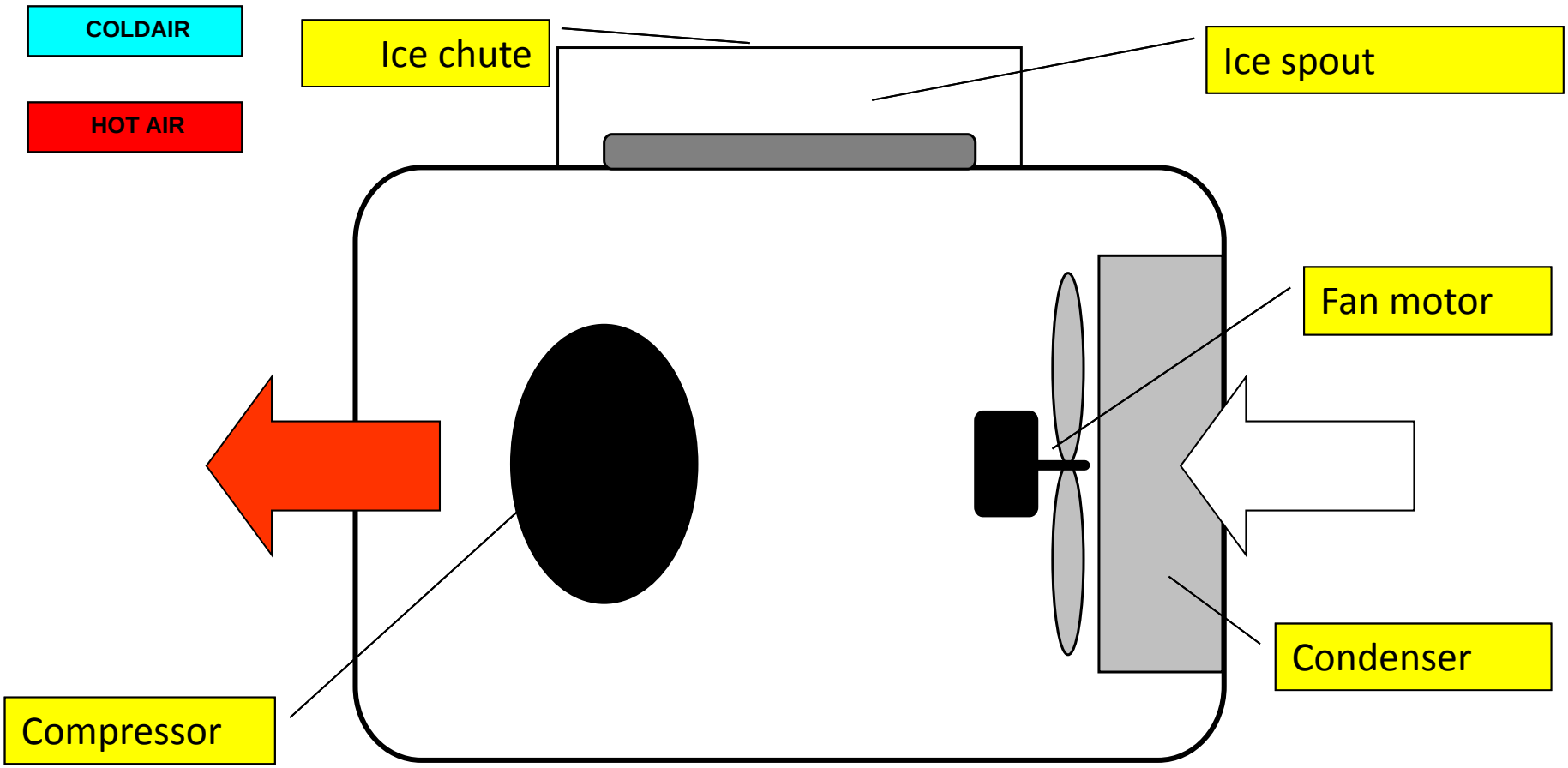
Operation limit condition :

- **Min. Ambient temperature** — **5ºC (50F)**
- **Max. Ambient temperature** — **40ºC (100F)**
- **Min. Water temperature** — **5ºC (40F)**
- **Max. Water temperature** — **35ºC (90F)**
- **Min. Water pressure** — **1 bar (14 PSI)**
- **Max. Water pressure** — **5 bar (70 PSI)**

Scotsman Ice Systems

NEW COMPACT SERIES

INSTALLATION - AIR FLOWING



MAR 56

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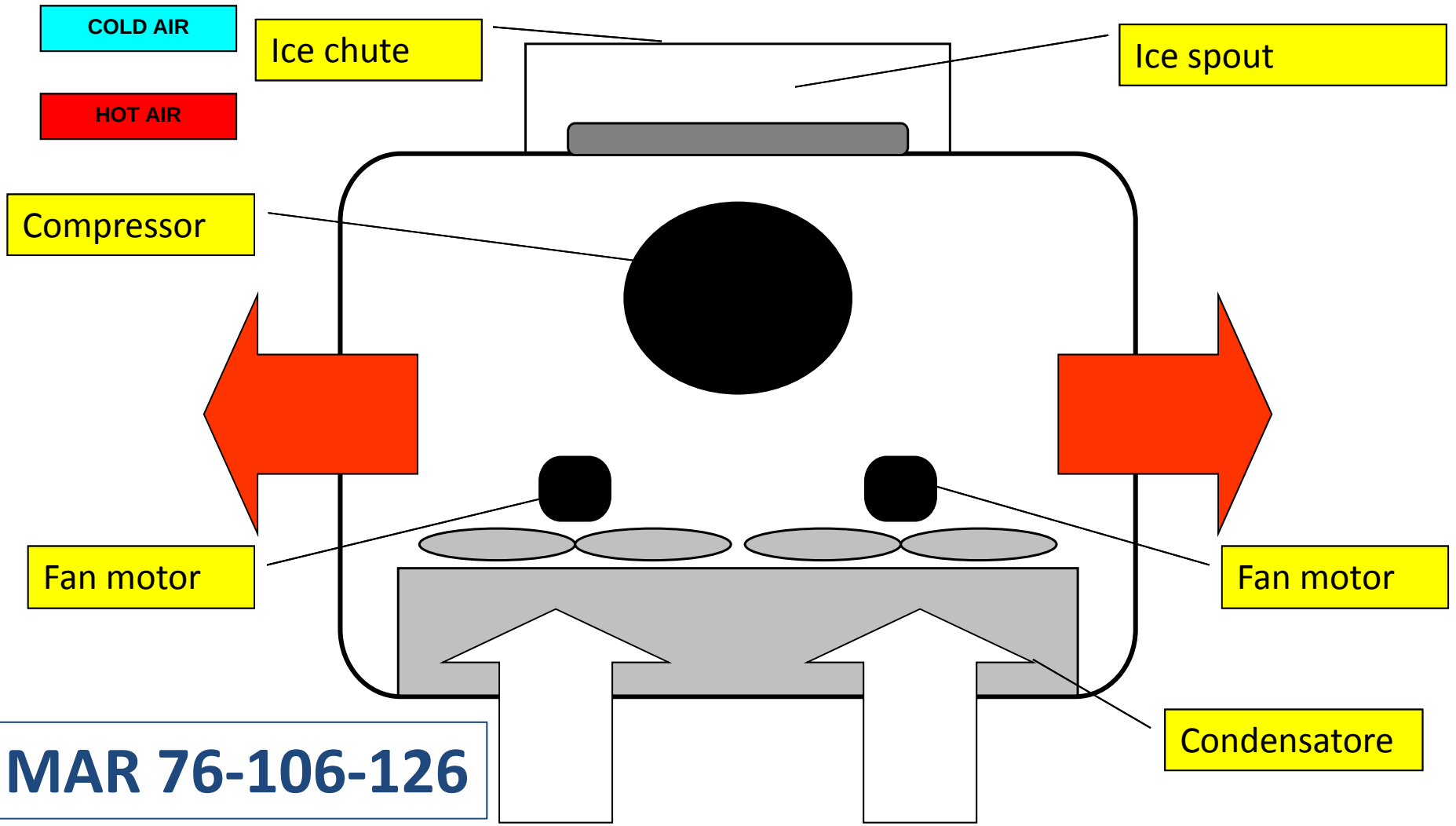
Ice Systems

NEW COMPACT SERIES

INSTALLATION - AIR FLOWING



MAR 76-106-126

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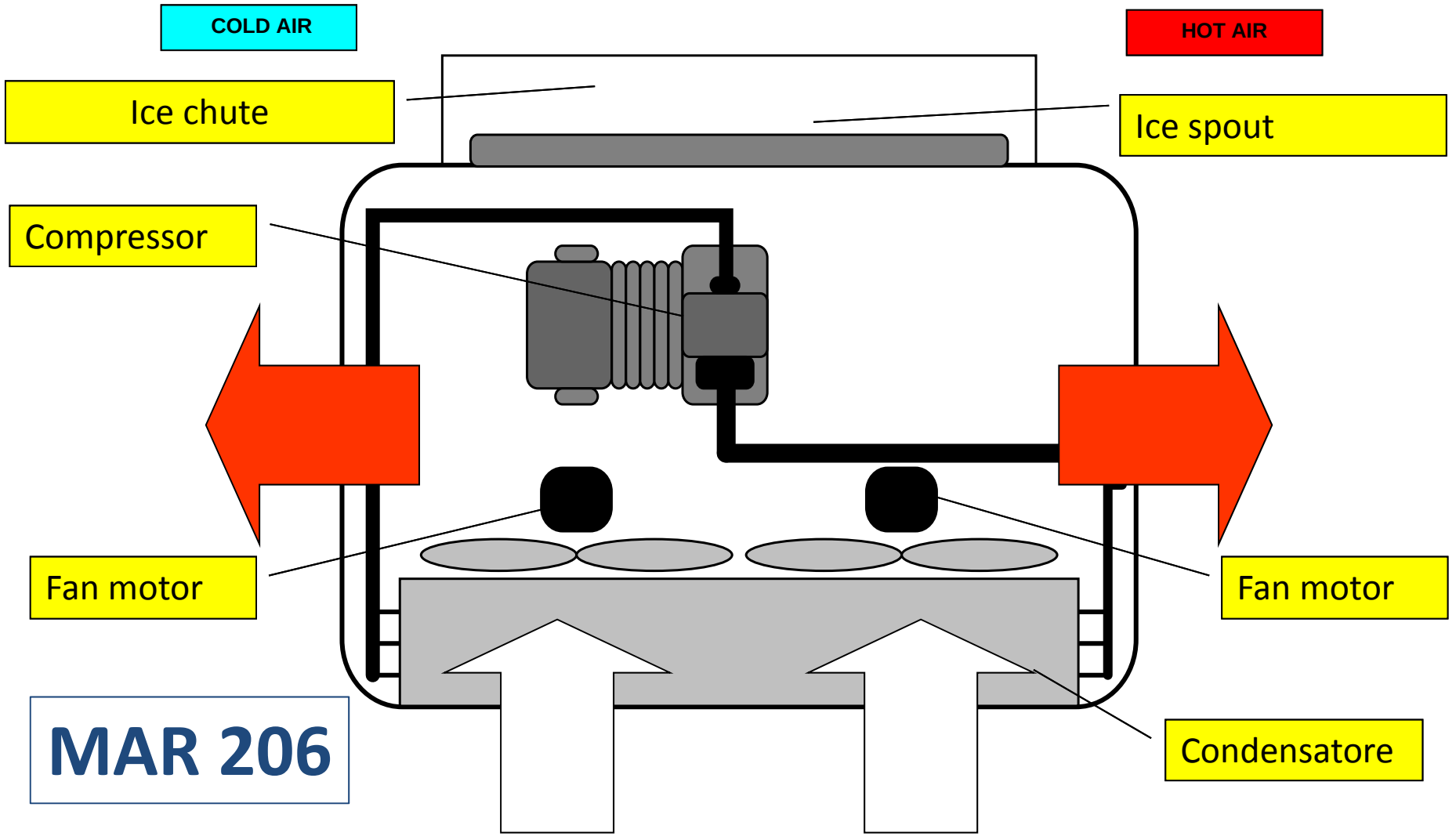
Ice Systems

NEW COMPACT SERIES

INSTALLATION - AIR FLOWING



MAR 206

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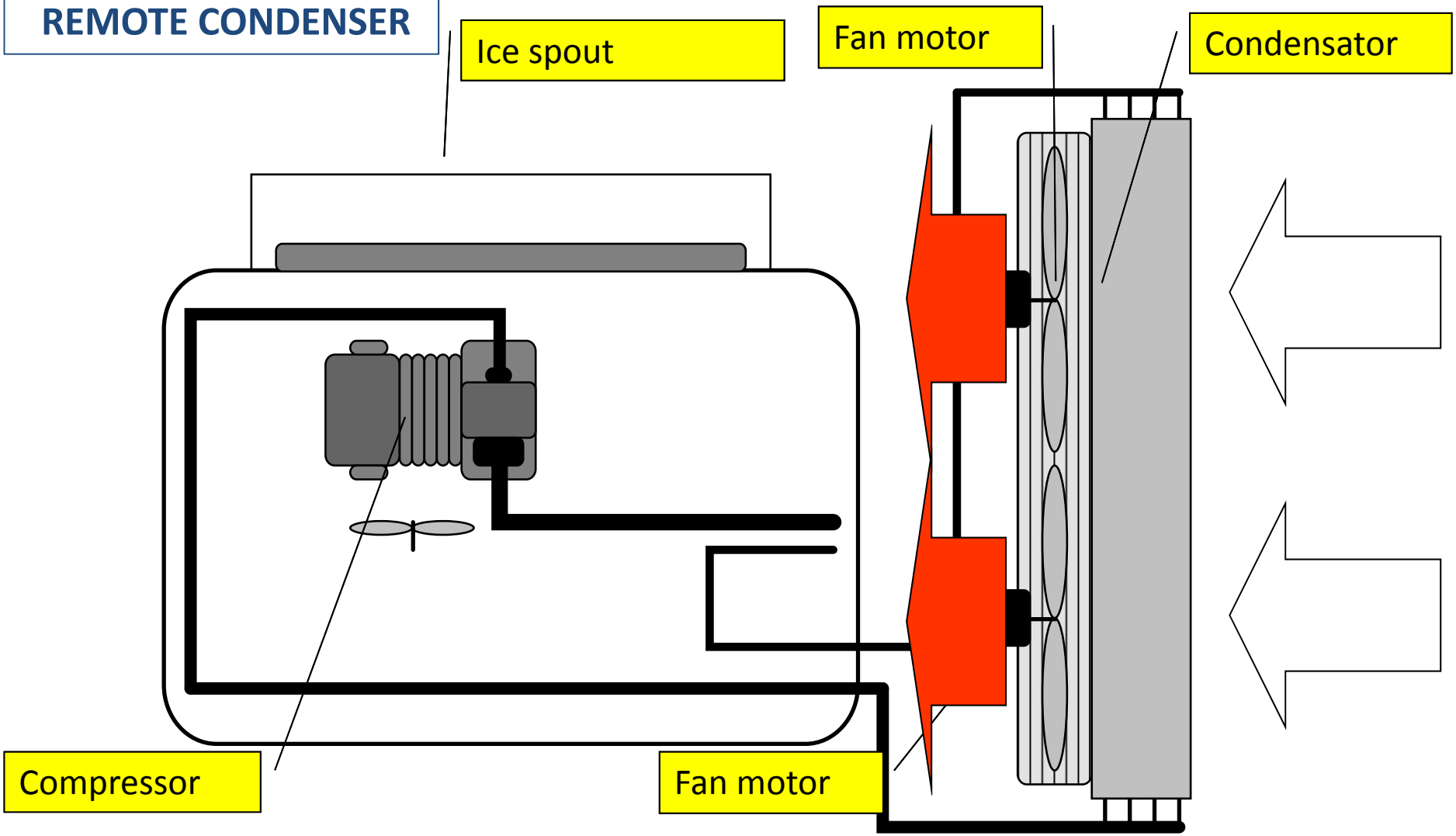
Ice Systems

NEW COMPACT SERIES

MAR 306
REMOTE CONDENSER

INSTALLATION - AIR FLOWING



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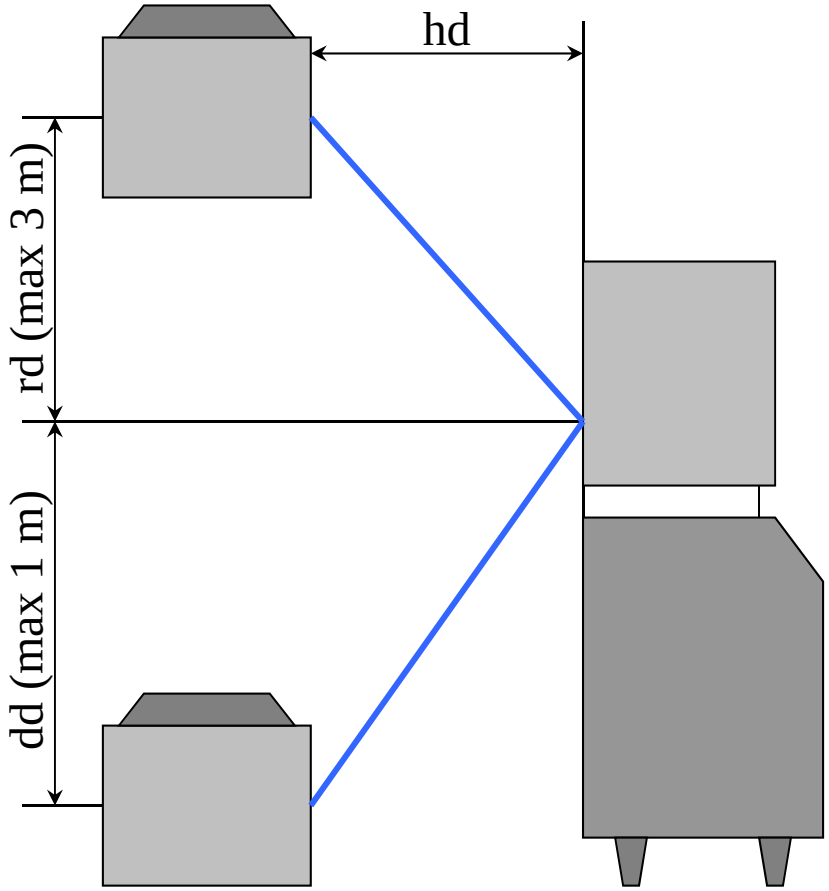
Ice Systems

NEW COMPACT SERIES

INSTALLATION – LIMITS LOCATION



MAR 306
REMOTE CONDENSER

CALCULATION FORMULA

(distances in METERS)

D+R+H < 9

where:

- D=Drop = dd×6.6
- R=Rise = rd×1.7
- H=Horiz. run = hd

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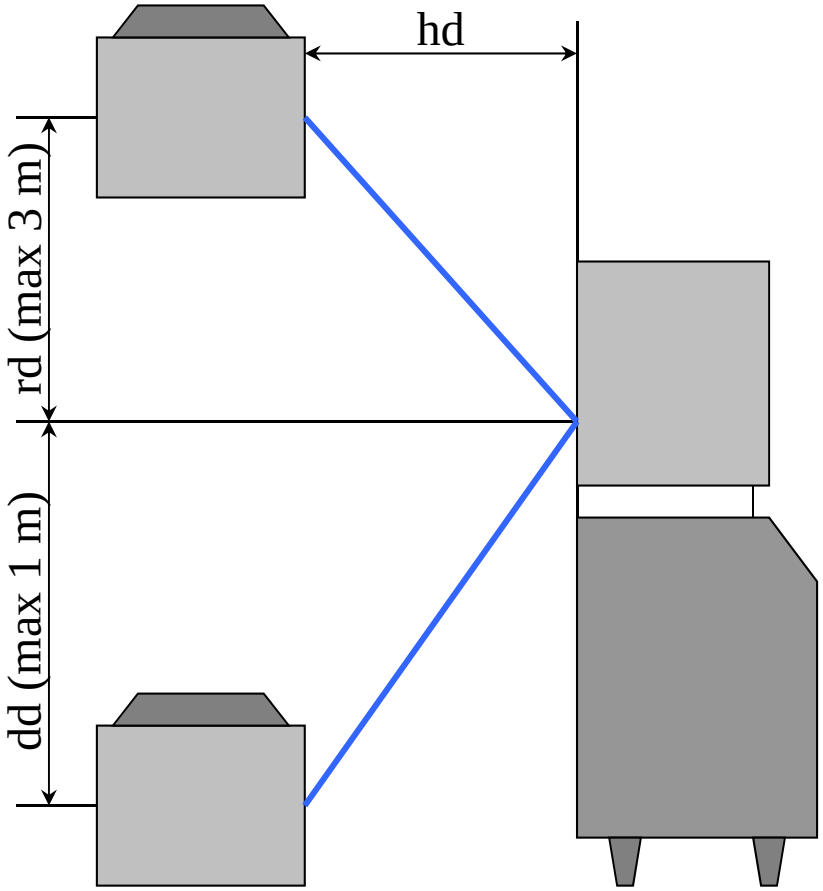
NEW COMPACT SERIES

INSTALLATION – LIMITS LOCATION



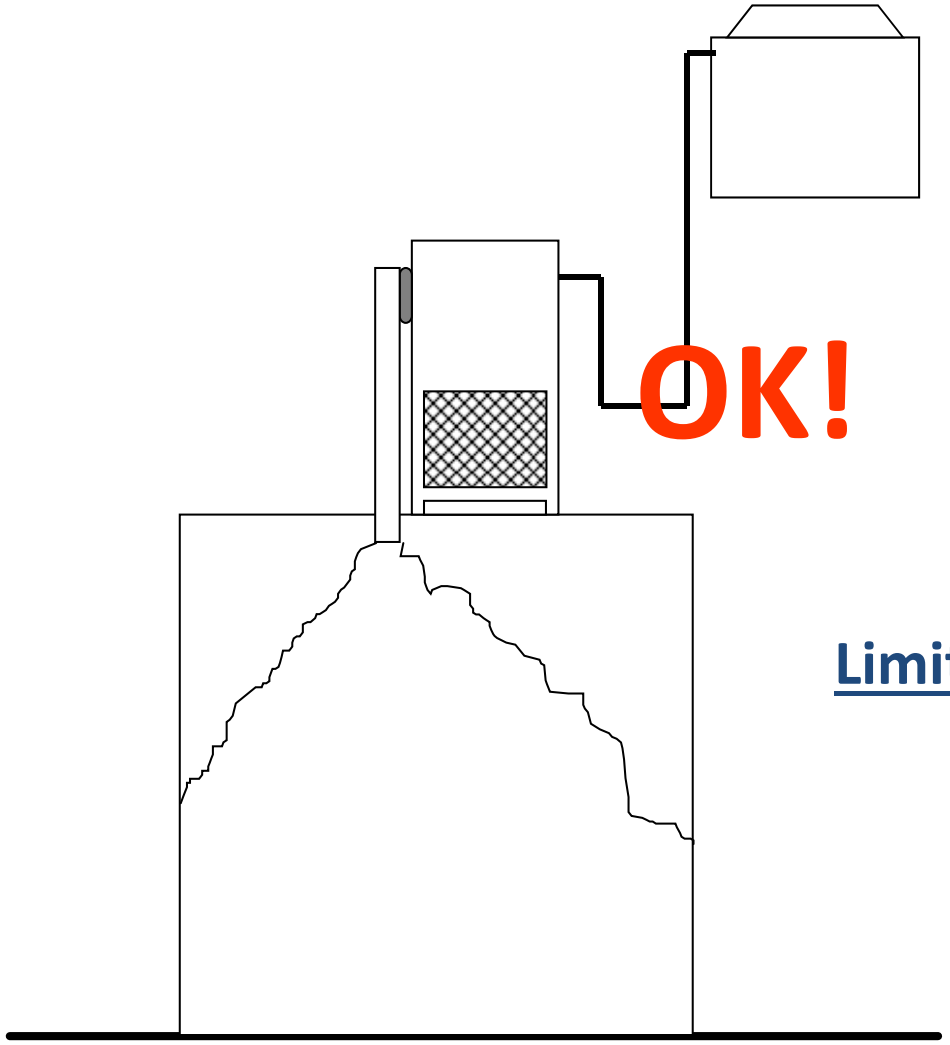
MAR 306 REMOTE CONDENSER

- Maximum rise machine-condenser: **3 physical meters**
- Maximum drop ice machine-condenser: **1 physical meter**
- Physical line set maximum length: **6 meters**
- Calculated line set maximum length: **9 meters**

Scotsman®
Ice Systems

NEW COMPACT SERIES

INSTALLATION – LIMITS LOCATION



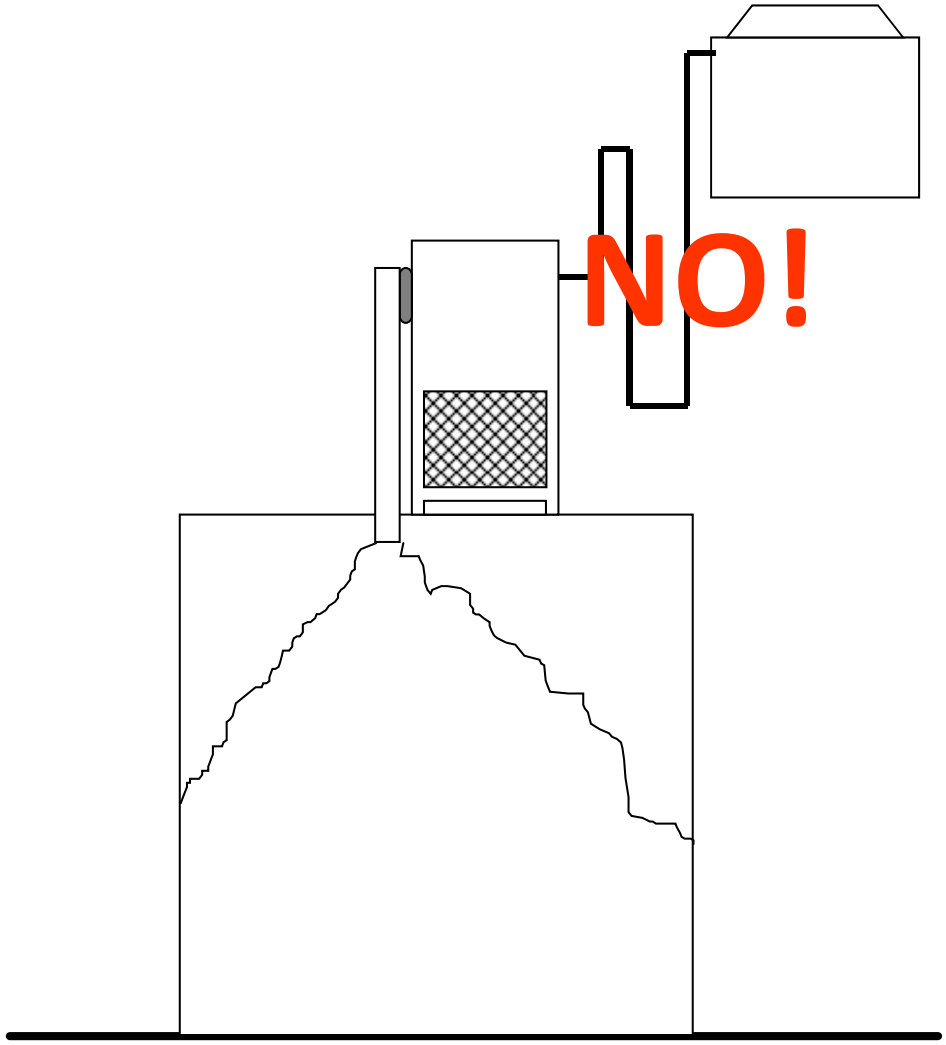
MAR 306 REMOTE CONDENSER

Limit to Max. one fall and one rise

Scotsman Ice Systems

NEW COMPACT SERIES

INSTALLATION – LIMITS LOCATION



MAR 306 REMOTE CONDENSER

DO NOT:

- **Route a line set that rises, then falls, then rises**
- **Route a line set that falls, then rises, then falls**

Scotsman® Ice Systems

NEW MAR COMPACT SERIES

INSTALLATION – ELECTRICAL PLUMBING

Cable size-Fuse protection of the unit:

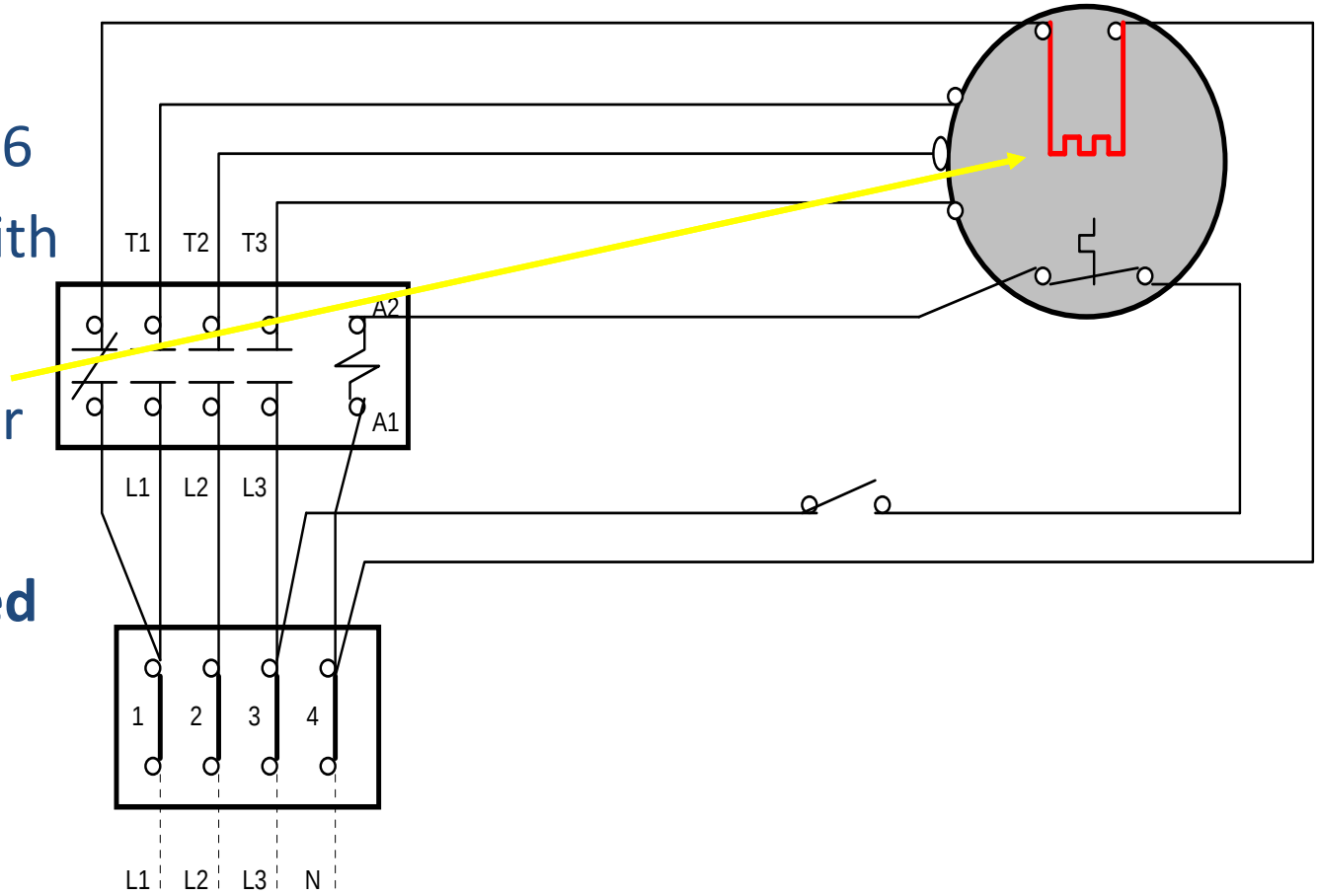
- MAR 56→126: 3×16 Ampere, 400 Volt
- MAR 206: 3×24 Ampere, 400 Volt
- MAR 306: 3×32 Ampere, 400 Volt

Scotsman Ice Systems

NEW MAR COMPACT SERIES

INSTALLATION – ELECTRICAL PLUMBING

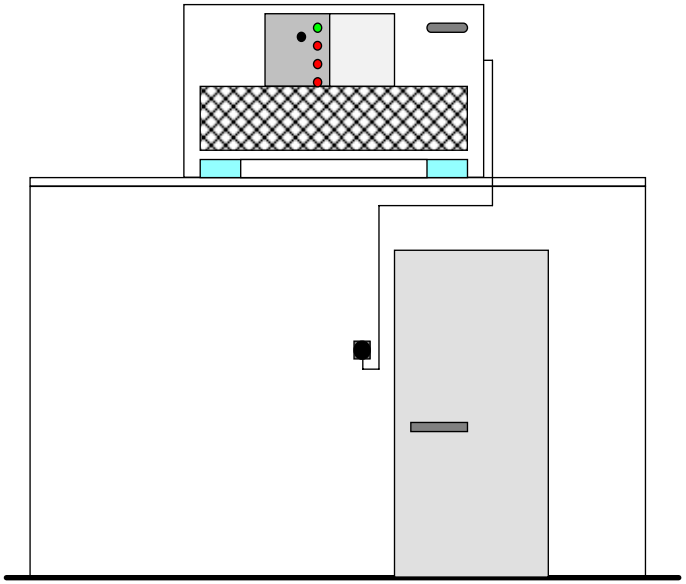
The MAR 106, 126, 206 and 306 are equipped with a compressor crankcase heater that **MUST be always energised** mainly with the machine in OFF mode.



Scotsman Ice Systems

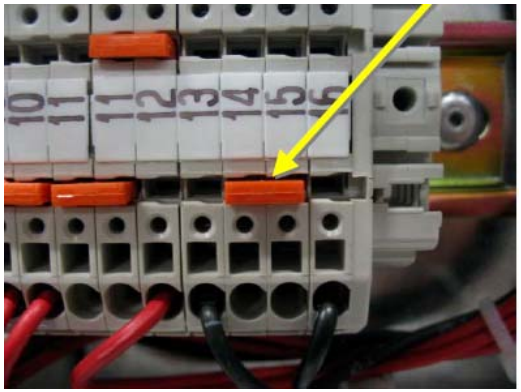
NEW MAR COMPACT SERIES

INSTALLATION – ELECTRICAL PLUMBING



It is possible to turn the the ice maker OFF by remote ctrl connecting device art NC contact #14 & # 15 i.e.:

- ICESENSOR0003
- REMOTE SWITCH



Scotsman®
Ice Systems

NEW MAR COMPACT SERIES

INSTALLATION – ELECTRICAL PLUMBING

At the first start up of the machine, it is IMPERATIVE to energize the unit (timer in the OFF position) at least 4 hours before the machine start up.

Scotsman®
Ice Systems

NEW MAR COMPACT SERIES

INSTALLATION – IDRAULIC CIRCUIT

Connect the 3/4” water inlet male threat to the water supply line by means of the rubber hose provided with machine.

Install on water supply line closed to the machine a water valve (tap).

Scotsman Ice Systems

NEW MAR COMPACT SERIES

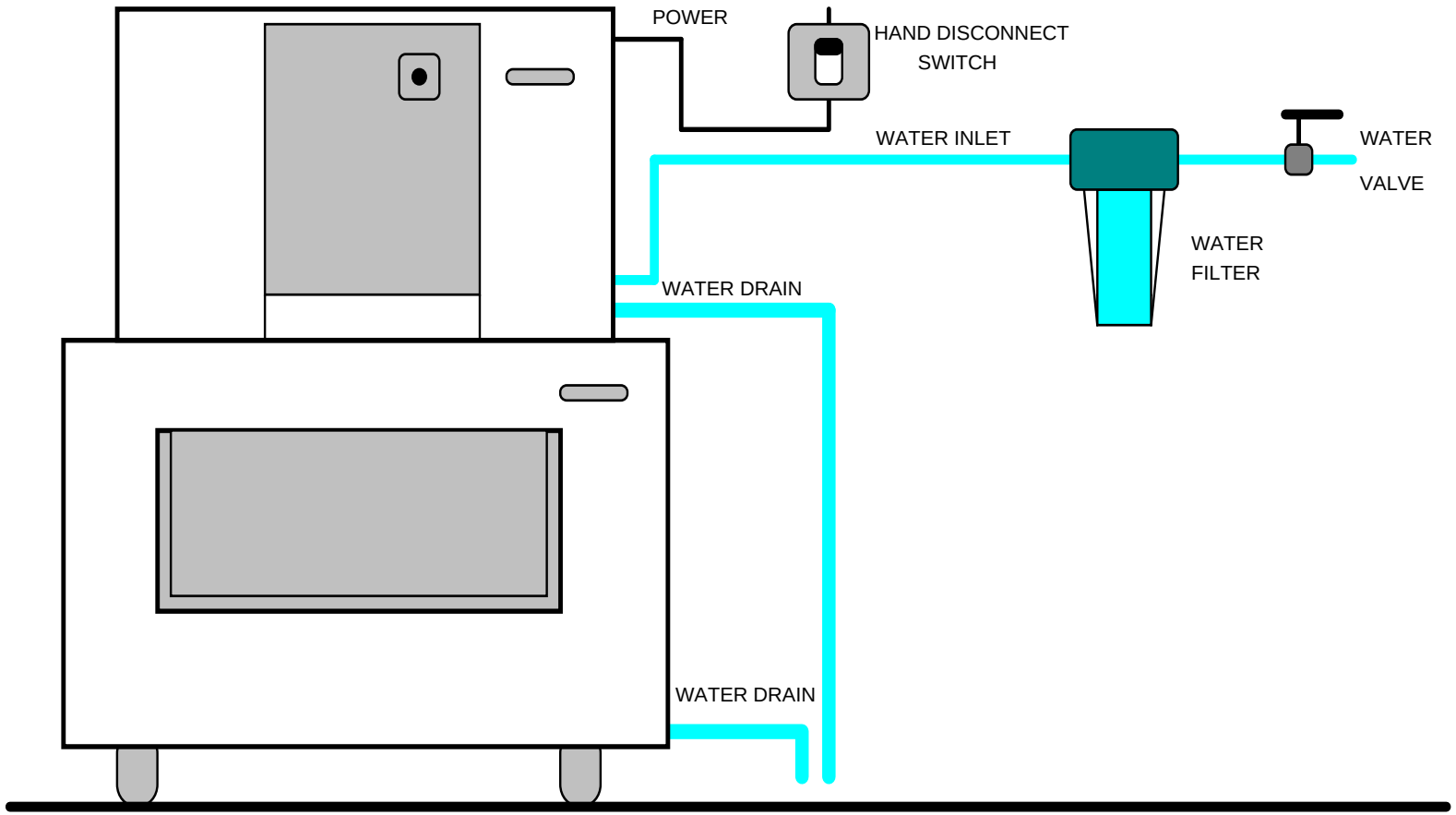
INSTALLATION – IDRAULIC CIRCUIT

Connect the 20 mm O.D. fitting of the water drain with the flexible hose supply with the machine securing by its proper clamp.

Scotsman®
Ice Systems

NEW MAR COMPACT SERIES

TYPICAL INSTALLATION

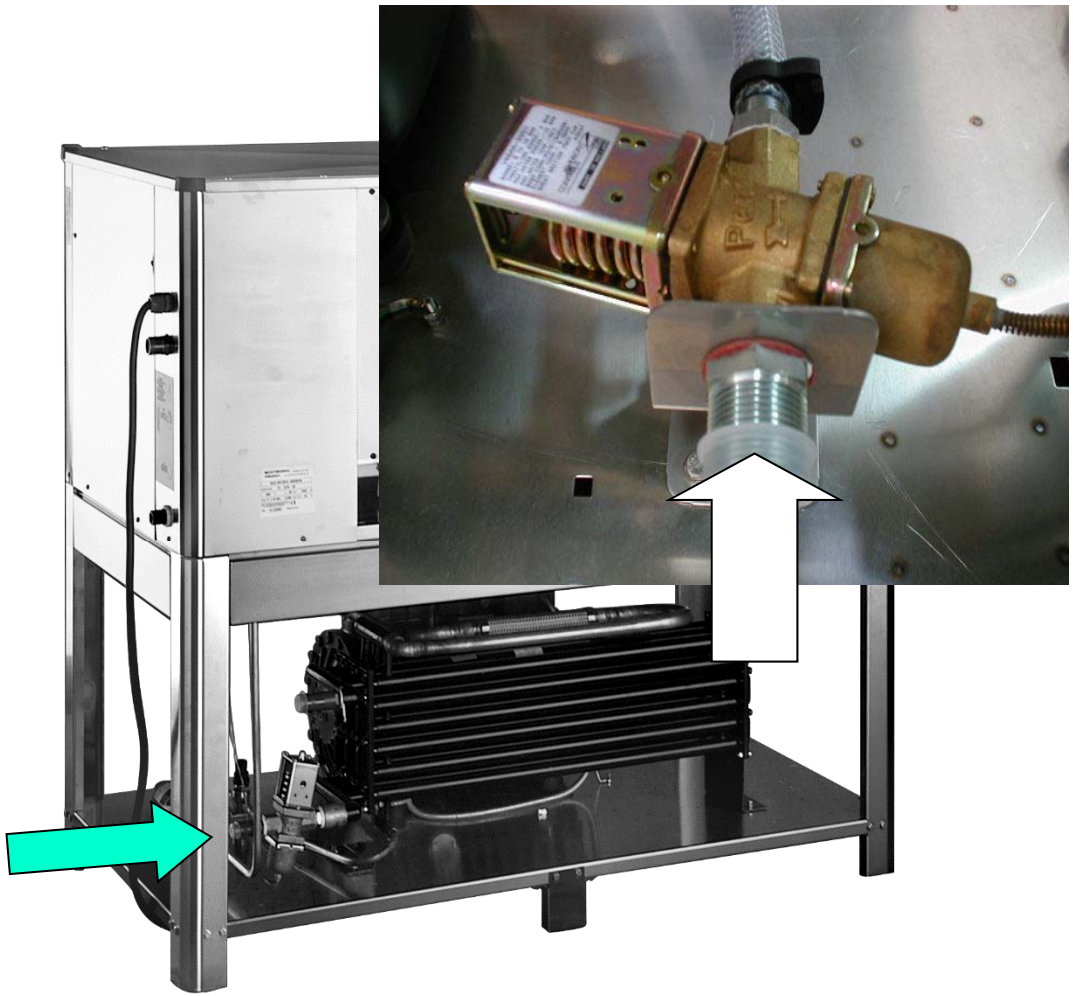


Scotsman Ice Systems

NEW MAR COMPACT SERIES

INSTALLATION – IDRAULIC CIRCUIT

On the water cooled version there is a separate male water inlet fitting connected directly to the water regulating valve that must be connect to the water supply line by means of a suitable hose and……

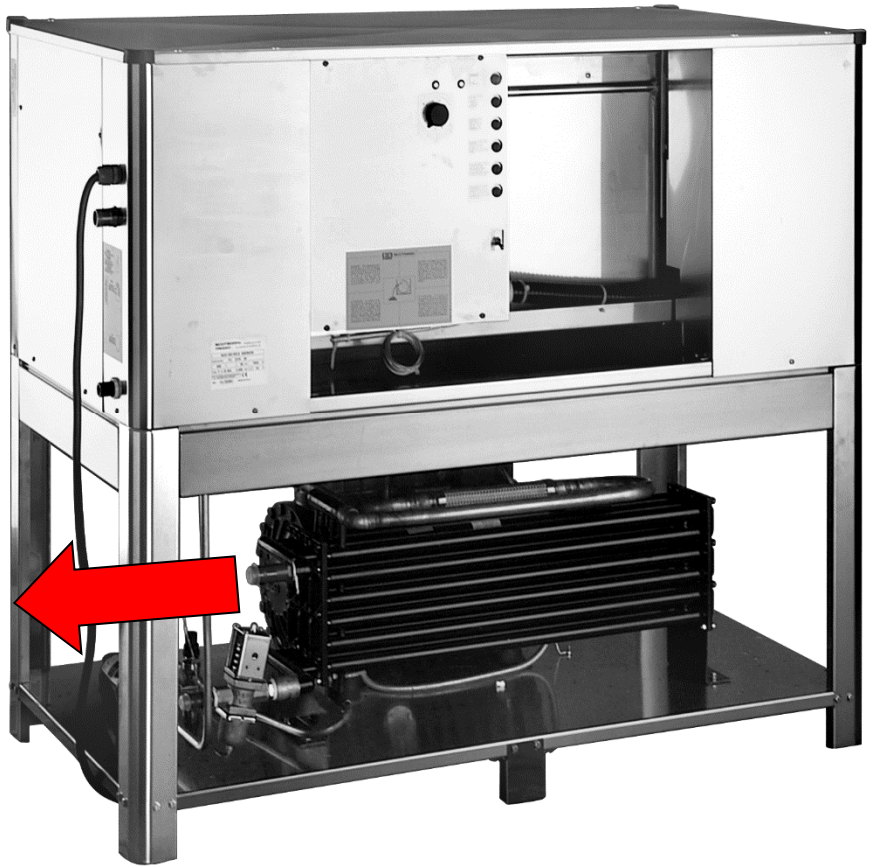


Scotsman Ice Systems

NEW MAR COMPACT SERIES

INSTALLATION – IDRAULIC CIRCUIT

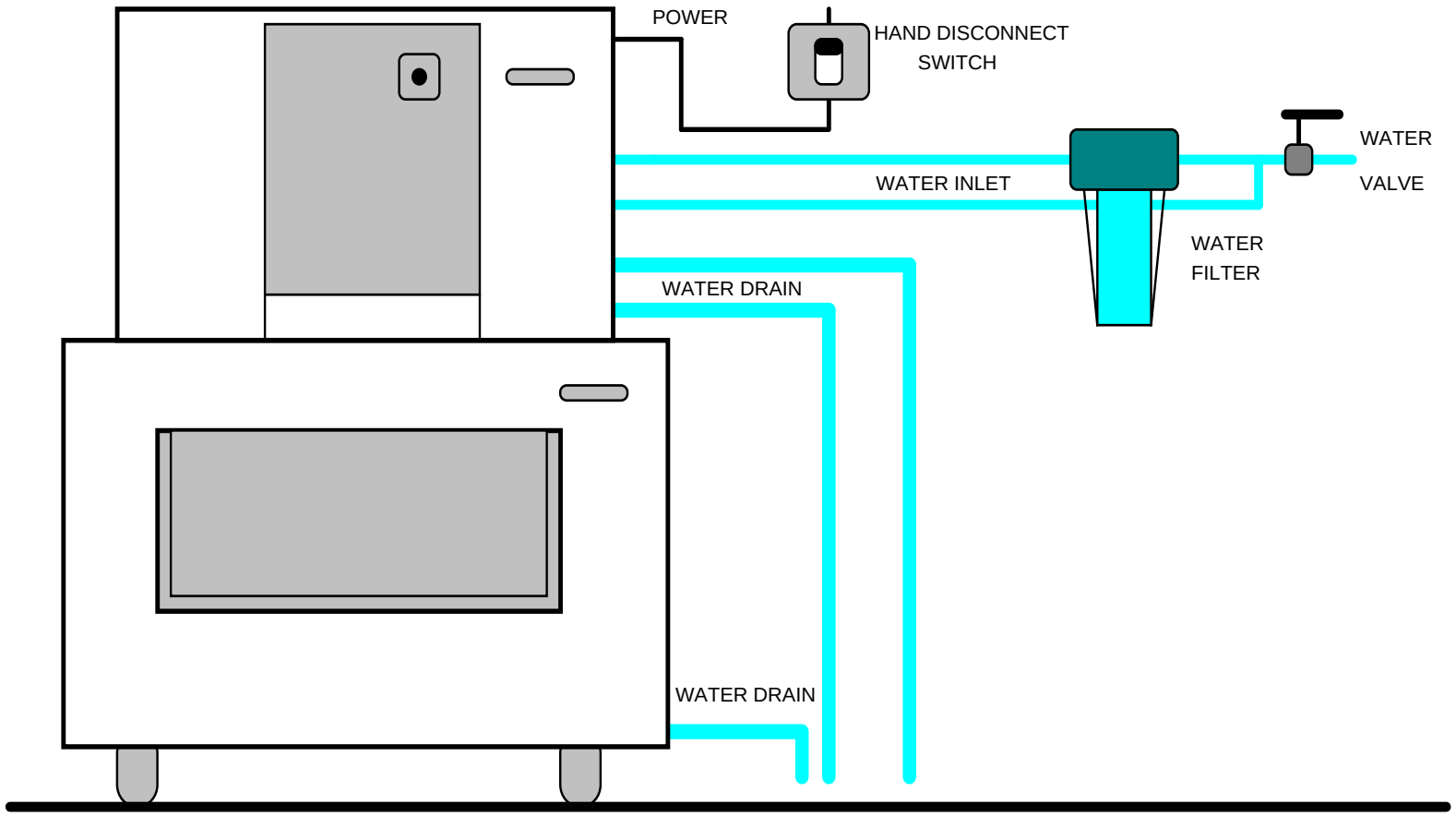
.....a separate male water drain fitting that must be connected to the drain receptacle with a separate hose.



Scotsman®
Ice Systems

NEW MAR COMPACT SERIES

TYPICAL INSTALLATION

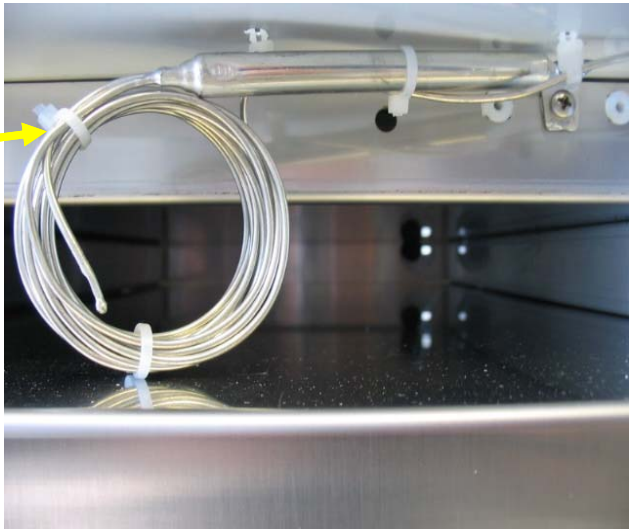


Scotsman Ice Systems

NEW MAR COMPACT SERIES

INSTALLATION - BIN THERMOSTAT

Remove bin thermostat clamps.



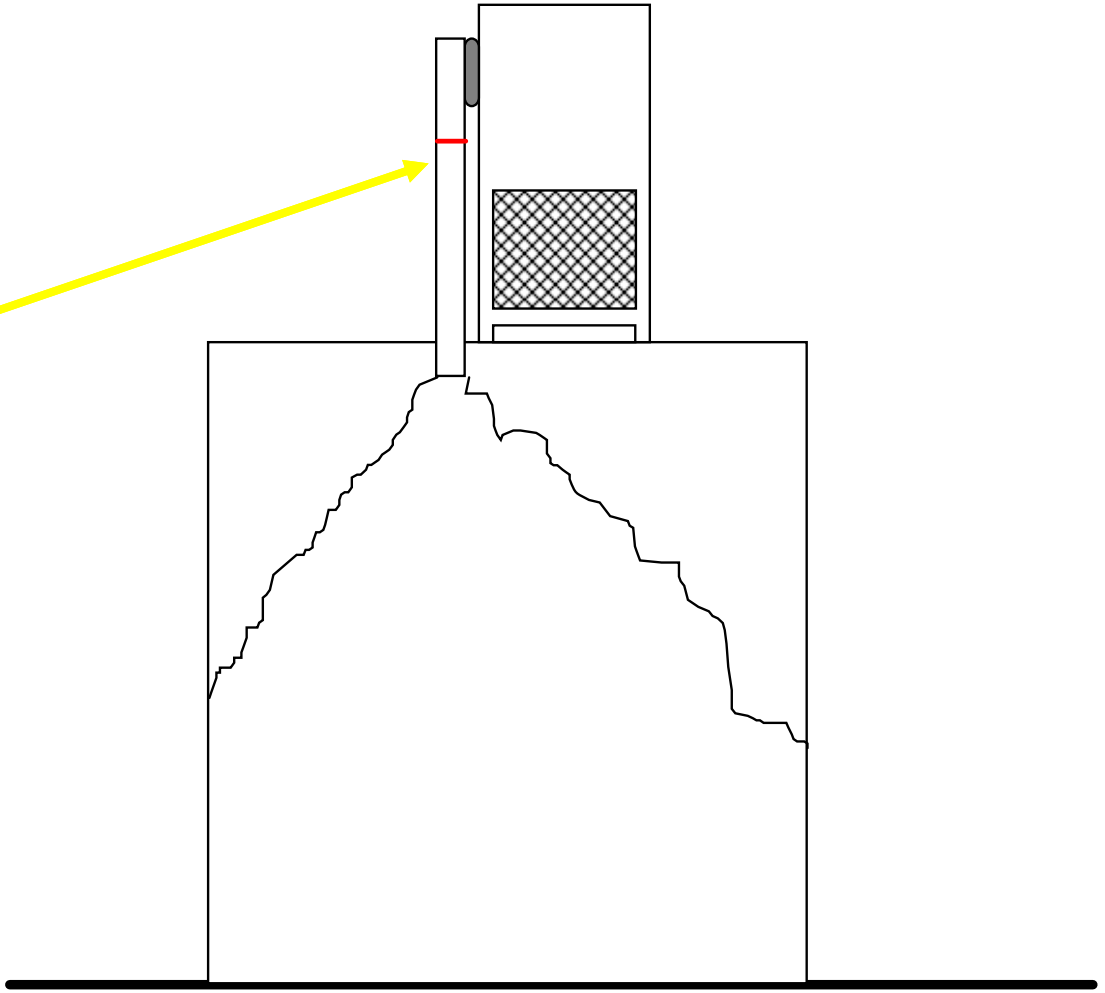
Run thermostat bulb underneath evaporator basin and pass the same throughout suitable hole located at ice spout

Scotsman Ice Systems

NEW MAR COMPACT SERIES

INSTALLATION - BIN THERMOSTAT

The machine remains in operation producing continuously the scale ice till the storage bin is completely full.



Scotsman®
Ice Systems

NEW MAR
COMPACT SERIES

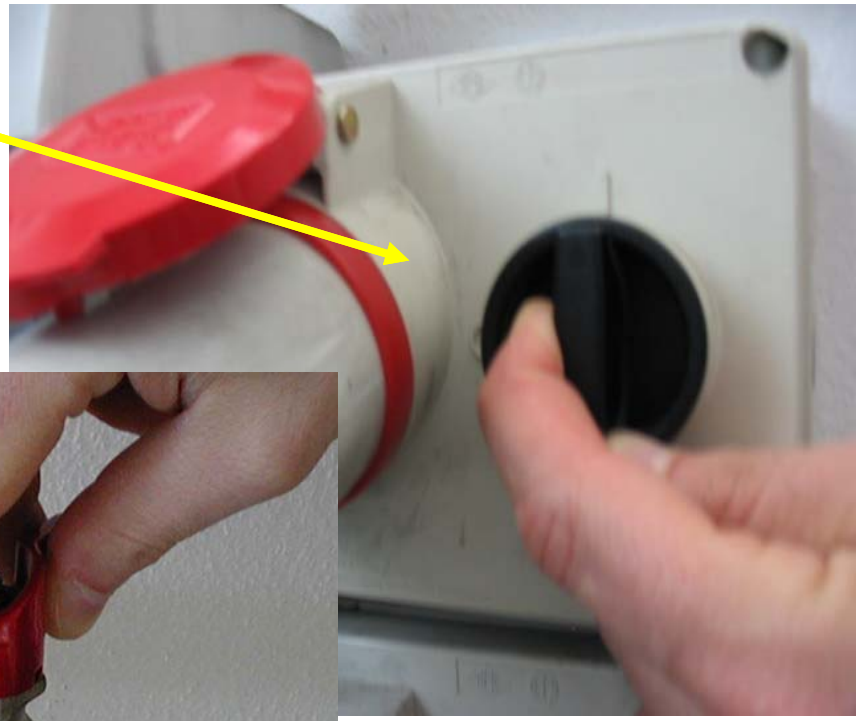
START UP CHECKING

Scotsman Ice Systems

NEW MAR COMPACT SERIES

START UP CHECKING

- Turn the unit ON
- OPEN shut OFF valve



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Ice Systems

NEW MAR COMPACT SERIES

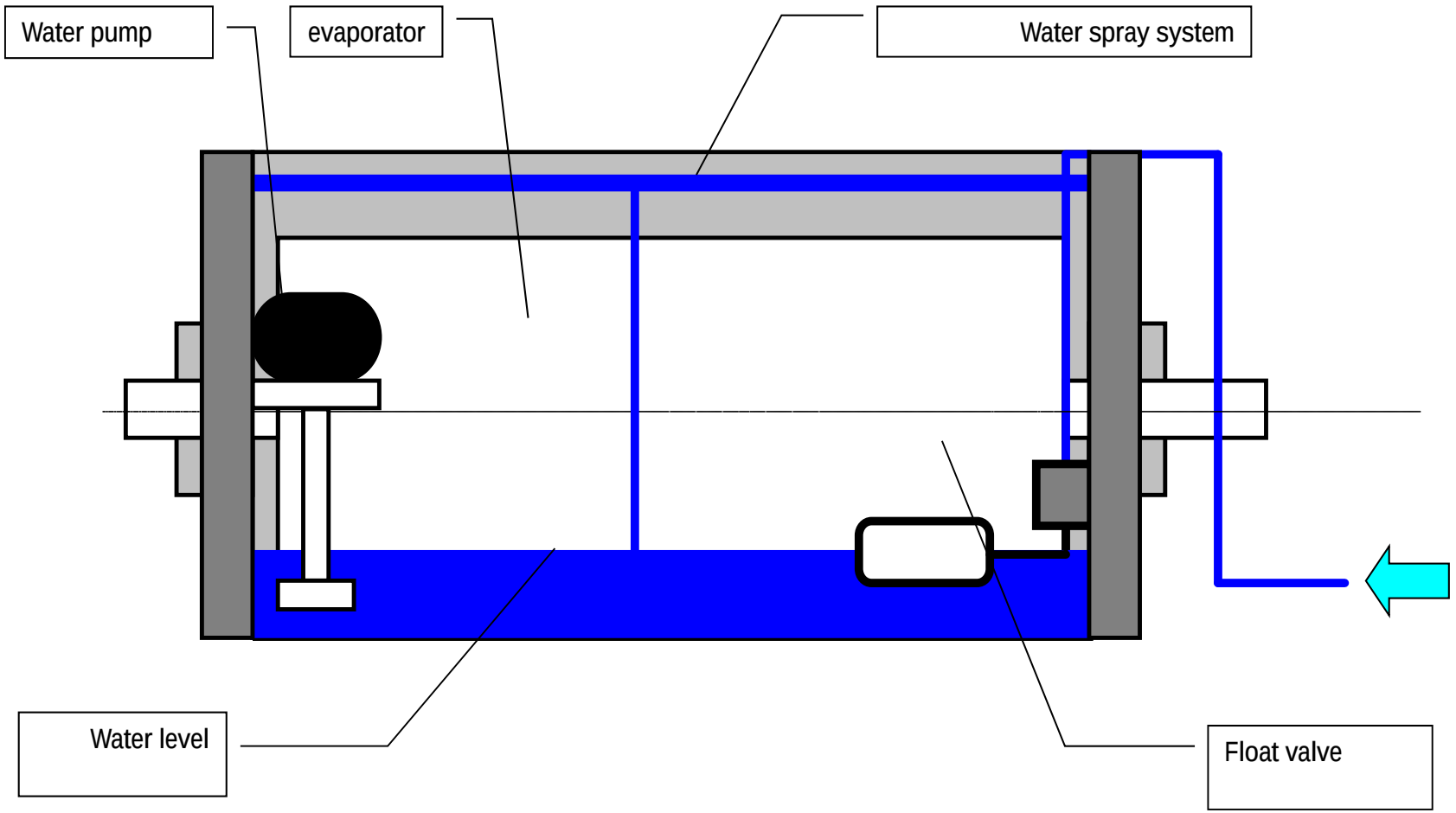
START UP CHECKING

…..the water is entering though the float valve flowing into the water basin.

Scotsman Ice Systems

NEW MAR COMPACT SERIES

START UP CHECKING



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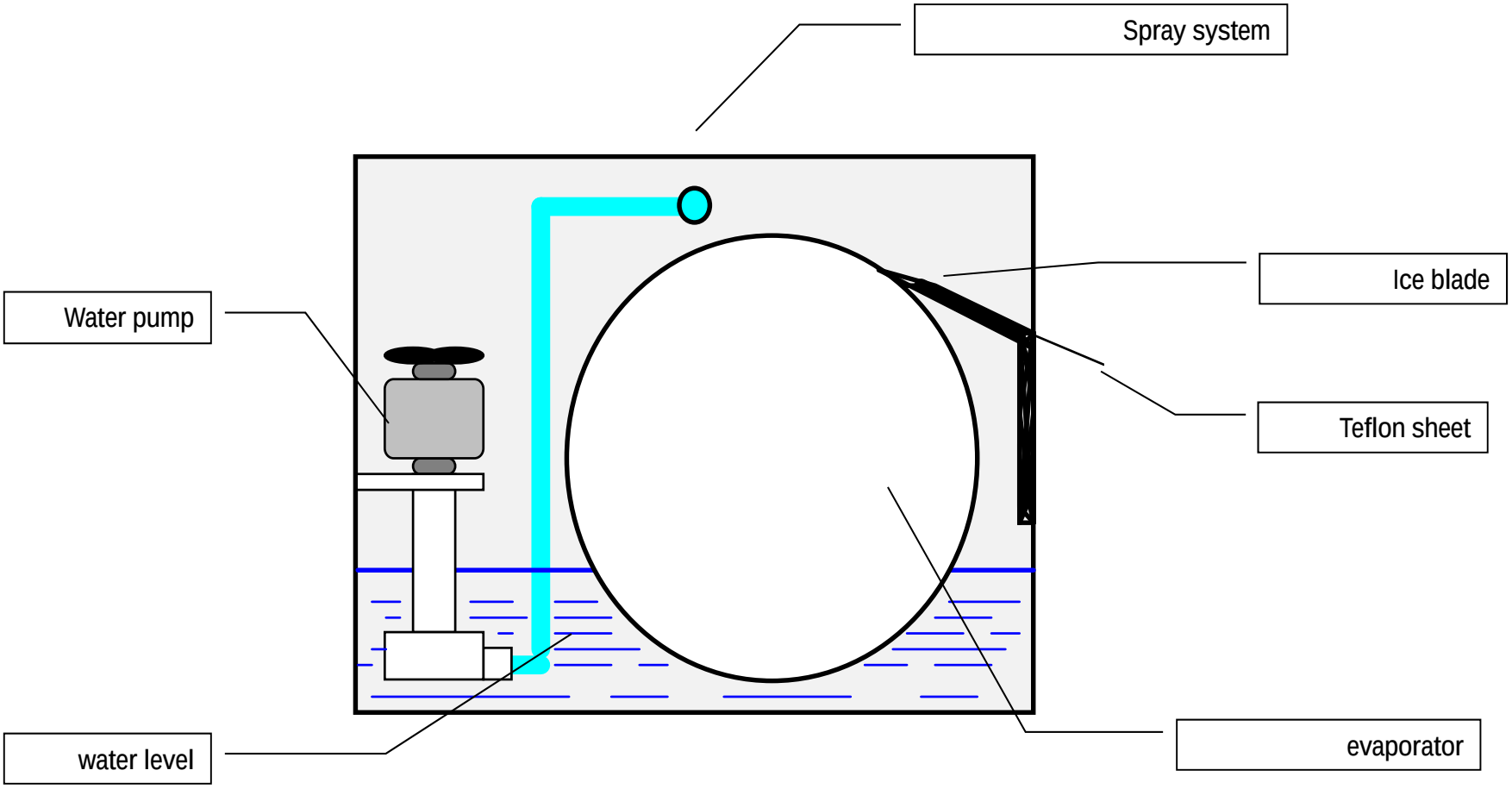
NEW MAR COMPACT SERIES

START UP CHECKING

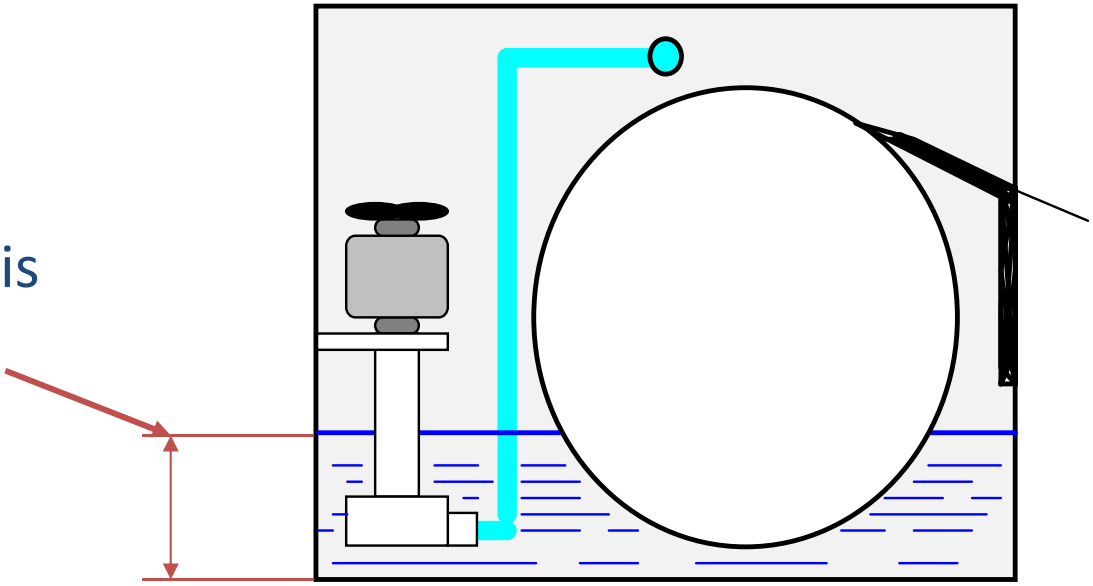


Scotsman Ice Systems

NEW MAR COMPACT SERIES

START UP CHECKING

The water level into the evaporator water basin is equal to:



MAR 56 →126: 50 mm (plastic reservoir)

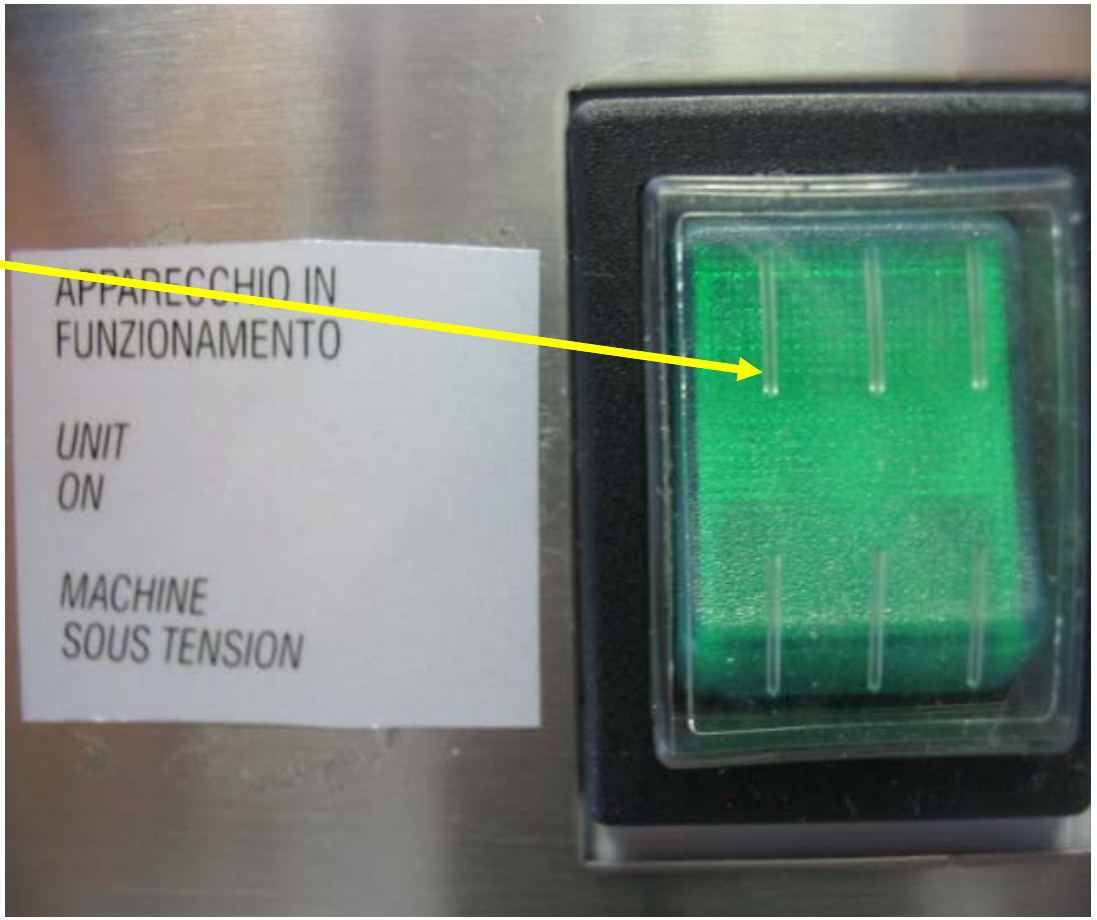
MAR 206-306: 90-95 mm

Scotsman Ice Systems

NEW MAR COMPACT SERIES

START UP CHECKING

Move power switch to **ON** position.



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Ice Systems

NEW MAR COMPACT SERIES

START UP CHECKING

WARNING!!!!

As the drive motor, turning the evaporator drum, is three phase it is **IMPERATIVE to check IMMEDIATELY at START UP** of the machine about the correct direction of rotation.

Scotsman®
Ice Systems

NEW MAR COMPACT SERIES

START UP CHECKING

MAR uses an electrical three phases control device which alerts installer in case of wrong wiring by keeping green **LED ON** .

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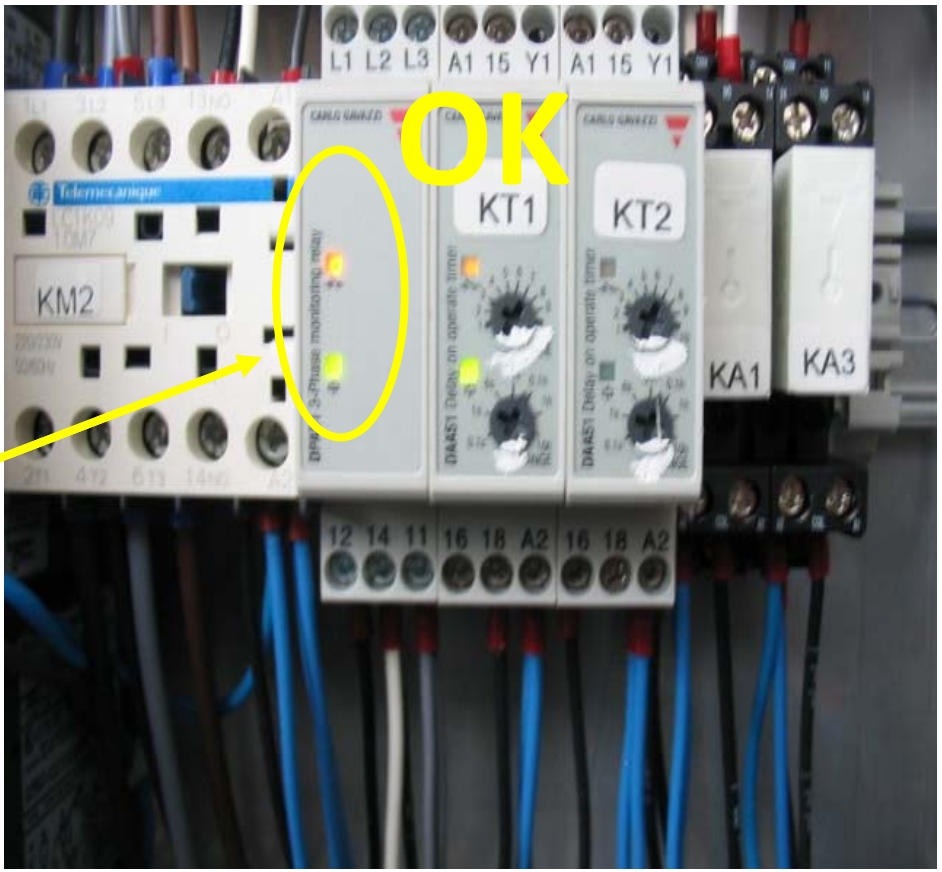
Ice Systems

NEW MAR COMPACT SERIES

START UP CHECKING

Correct wiring is shown by both LEDs Green and Orange steady ON together.



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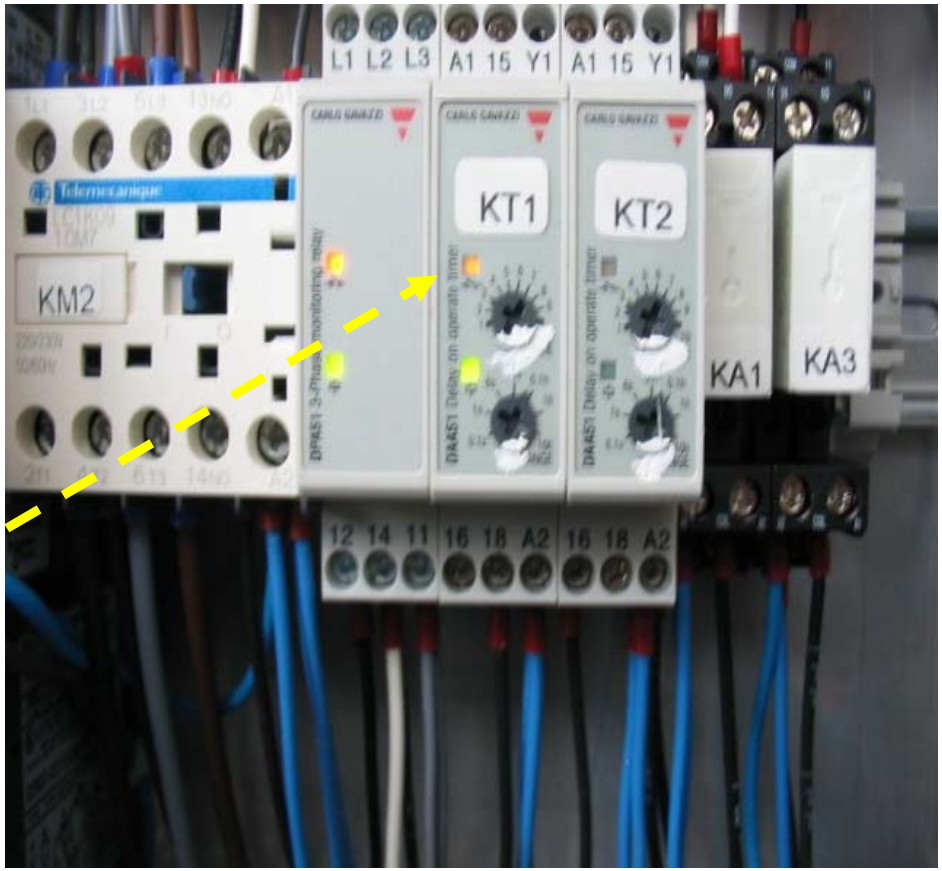
Ice Systems

NEW MAR COMPACT SERIES

START UP CHECKING

Meanwhile unit is under power KT1 device is energized as well in order to delay compressor start up by 18'Later and orange LED blinks



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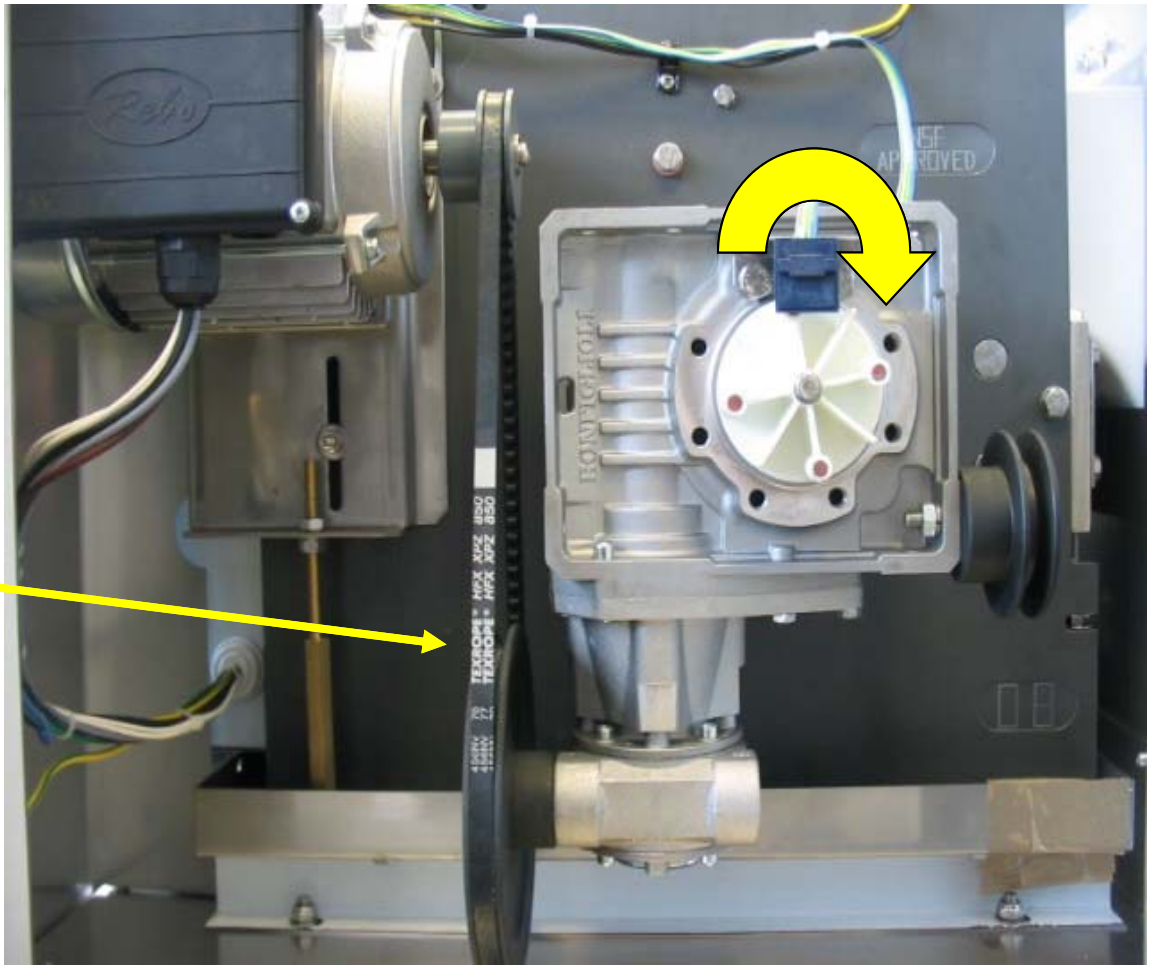
Ice Systems

NEW MAR COMPACT SERIES

START UP CHECKING

By means of a pulleys and V belt transmission the gear reducer starts to turn in clockwise direction moving the shaft of the drum.

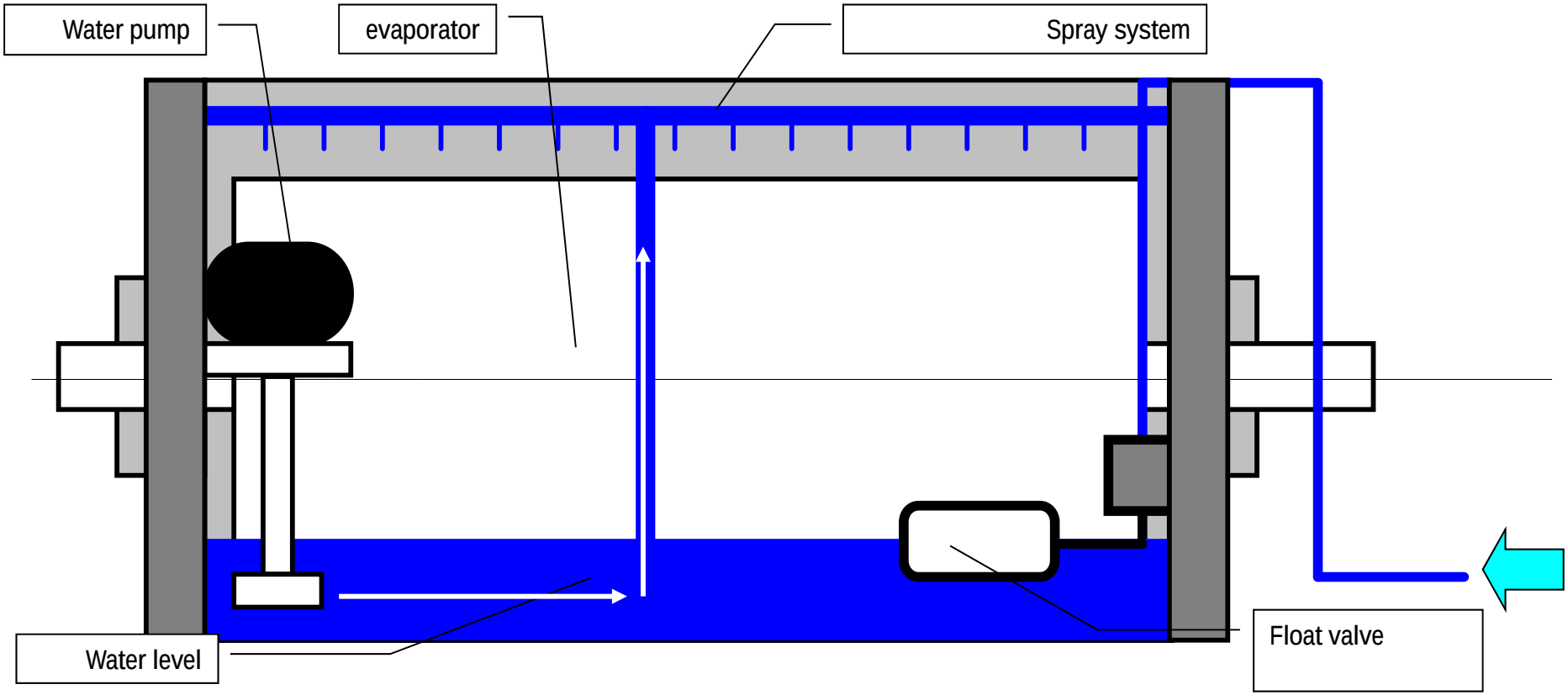


Scotsman Ice Systems

NEW MAR COMPACT SERIES

START UP CHECKING

In the meantime also the water pump is in operation sucking water from the evaporator basin and distributing the same to the upper distributor tube.



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Ice Systems

NEW MAR COMPACT SERIES

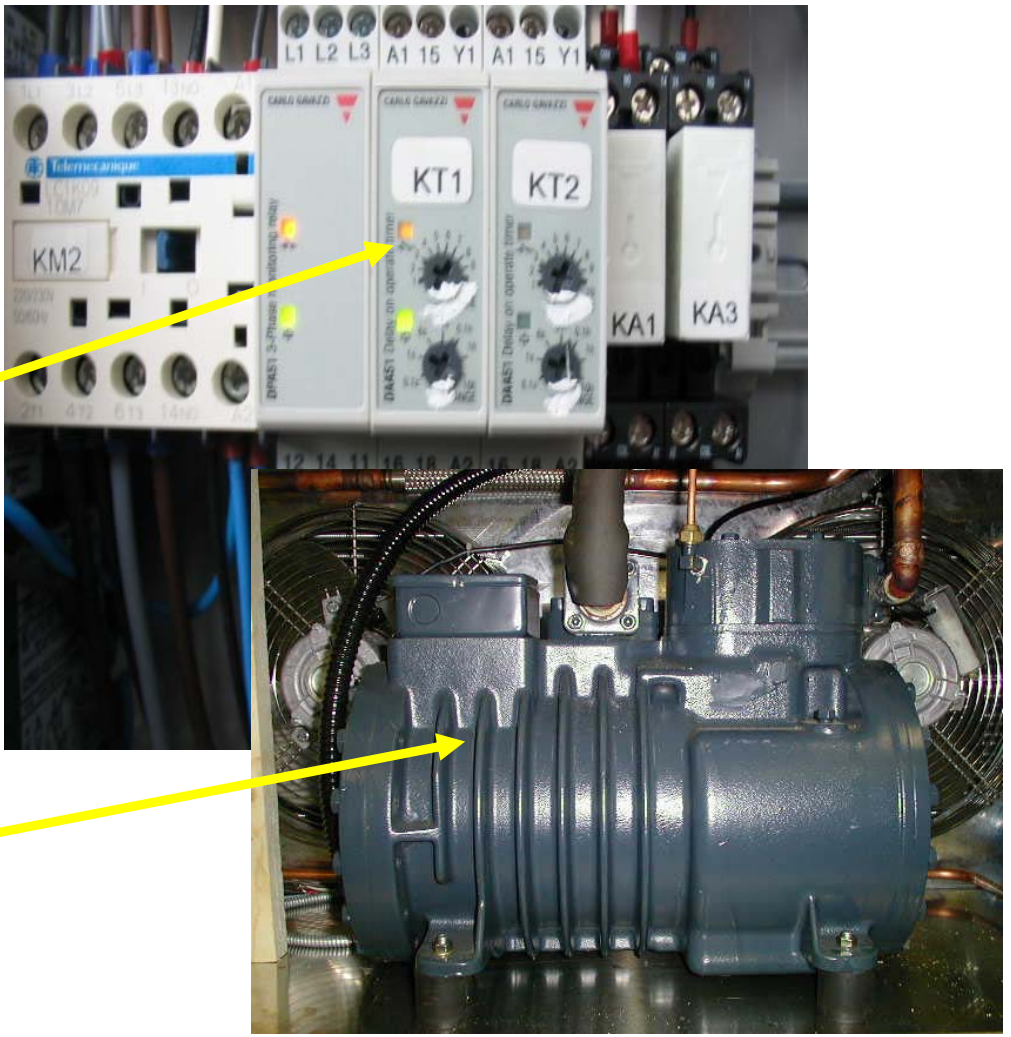
START UP CHECKING

Once 18’ is elapsed

orange LED goes

steady ON and

compressor starts.

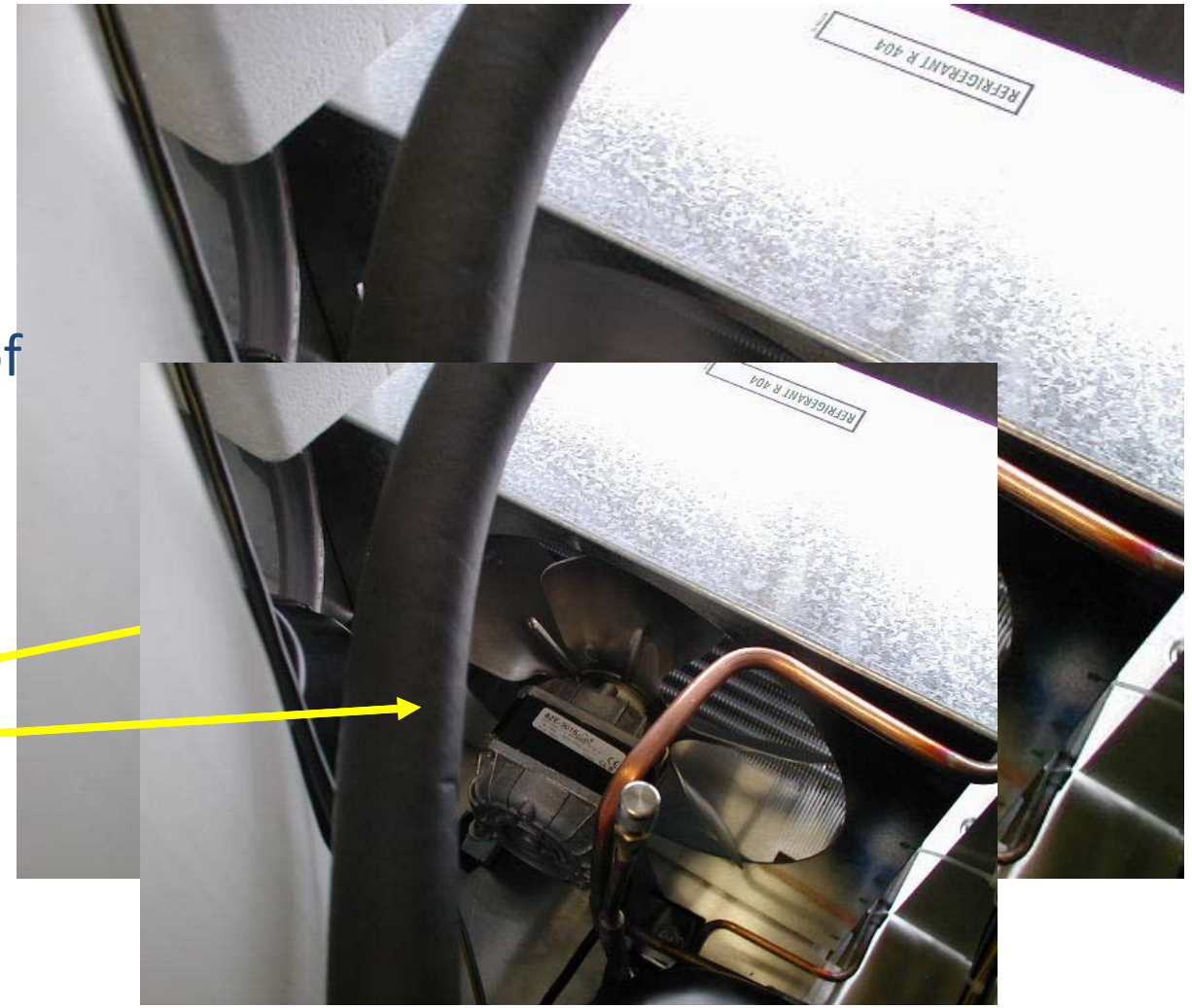


Scotsman Ice Systems

NEW MAR COMPACT SERIES

START UP CHECKING

On the air cooled version, as soon as the condensing temperature rises up to the CUT IN value of the fan pressure control, the fan motor starts to turn in **ON**……OFF



Scotsman Ice Systems

NEW MAR COMPACT SERIES

START UP CHECKING

Fan pressure control is located at control box and keeps operating pressures as :

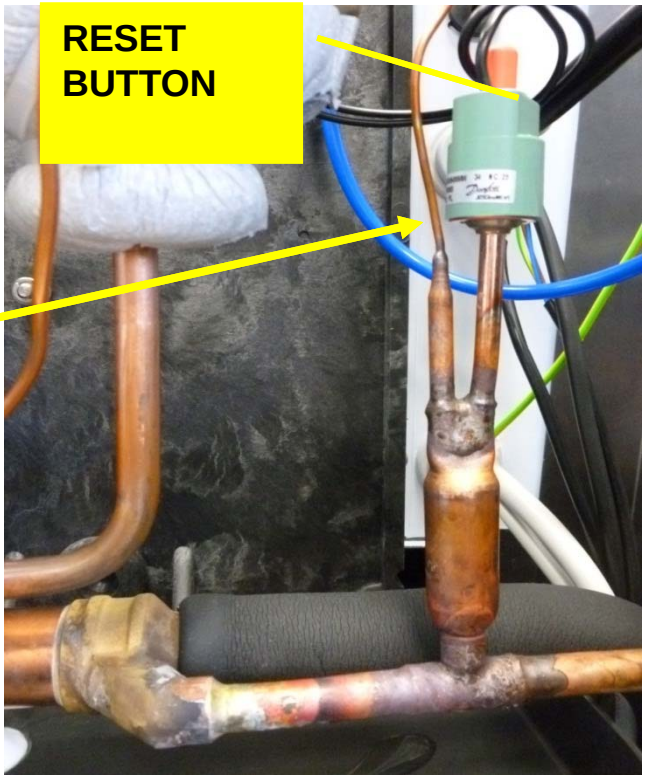
- Cut IN: 17 bar (250 psi)
- Cut OUT: 15 bar (220 psi)

Scotsman Ice Systems

NEW MAR COMPACT SERIES

START UP CHECKING

MAR series are also equipped by a manual reset HI pressure switch:



OPERATING SETTING:

- **34±2 bar (480±30 psi) AIR cooled models**
- **30 bar (420 psi) WATER cooled models**

Scotsman Ice Systems

NEW MAR COMPACT SERIES

START UP CHECKING

….as well as an Automatic Reset Low Pressure Switch directly installed on the suction line and cutting Off at 0.2 bar (3 psi).

Scotsman® Ice Systems

NEW MAR COMPACT SERIES

START UP CHECKING

The quantity of heat rejected as well as the flow rate of the fan motor/s of the different MAR models is listed on the attached chart.

	Heat exchange (Kcal/h - BTU)	Air m3/h
MAR 56	3000-12000	1200
MAR 76	4900-19500	1200
MAR 106	7500-30000	1200
MAR 126	9750-38800	1200
MAR 206	11000-43800	2000
MAR 306 RC	16200-64500	4000

Scotsman®
Ice Systems

NEW MAR COMPACT SERIES

START UP CHECKING

After two-three

minutes the refrigerant

manifold used to

supply refrigerant to

the drum start to be

frosted….

Scotsman®
Ice Systems

NEW MAR COMPACT SERIES

START UP CHECKING

….and few seconds later the first pieces of scale ice are scraped from the outside surface of the drum by the S.S. scraping blade.

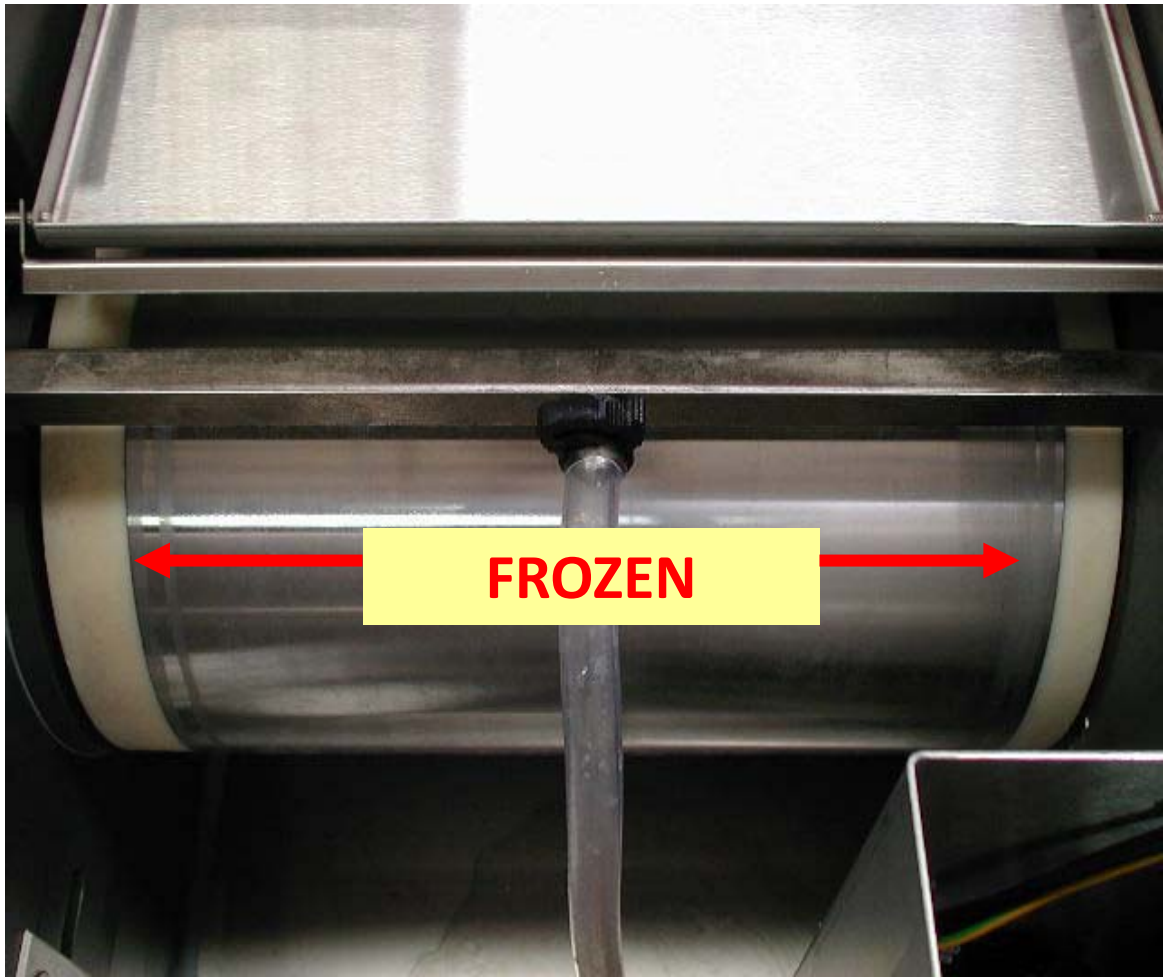
Scotsman® Ice Systems

NEW MAR COMPACT SERIES

START UP CHECKING

After approximately 20-30 minutes of operation the evaporator drum must be frosted from side to side.

If not, EXP valve adjustment may be required.

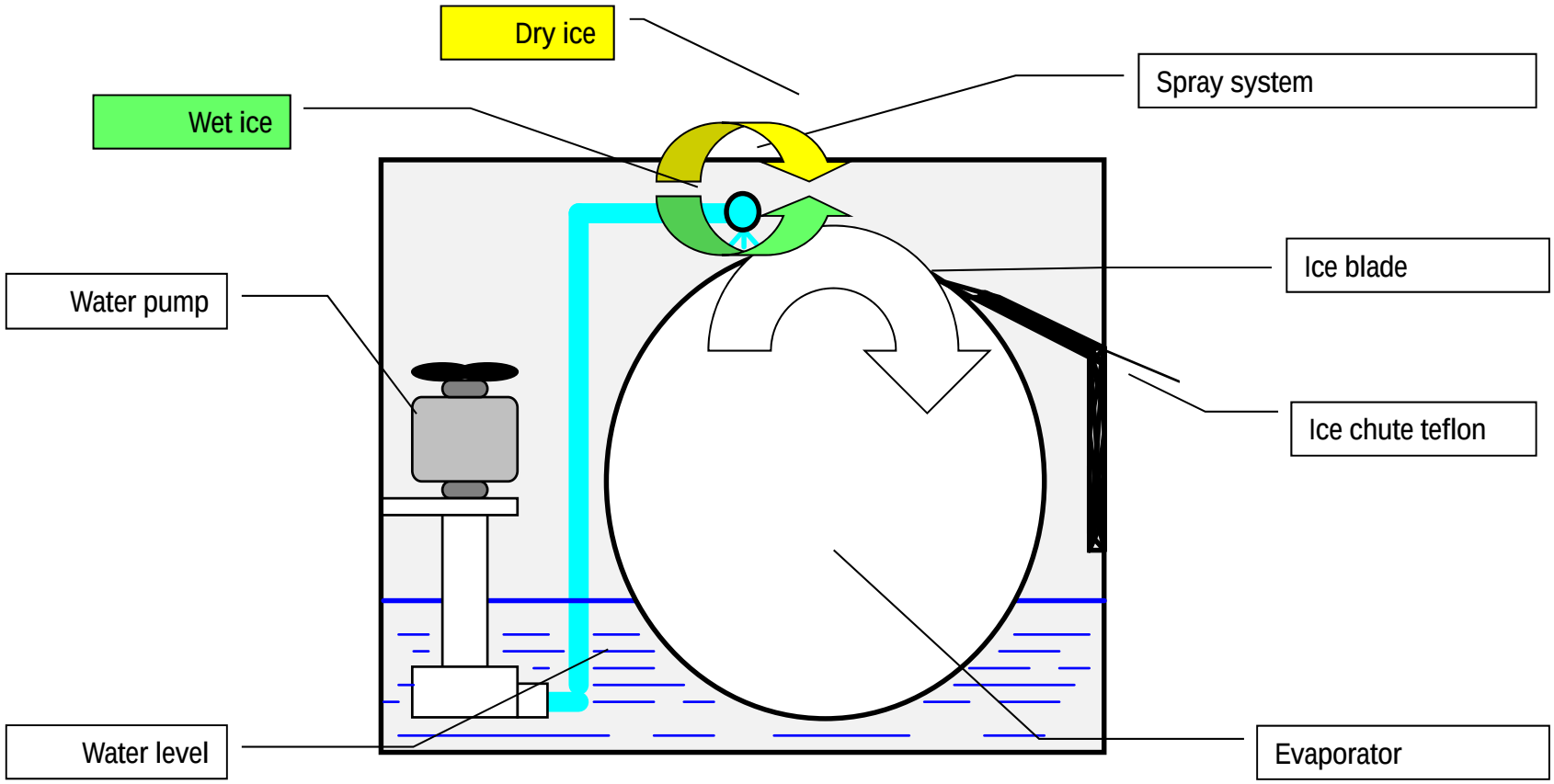


Scotsman Ice Systems

NEW MAR COMPACT SERIES

START UP CHECKING

Turning spray system will change ice quality wet/dry

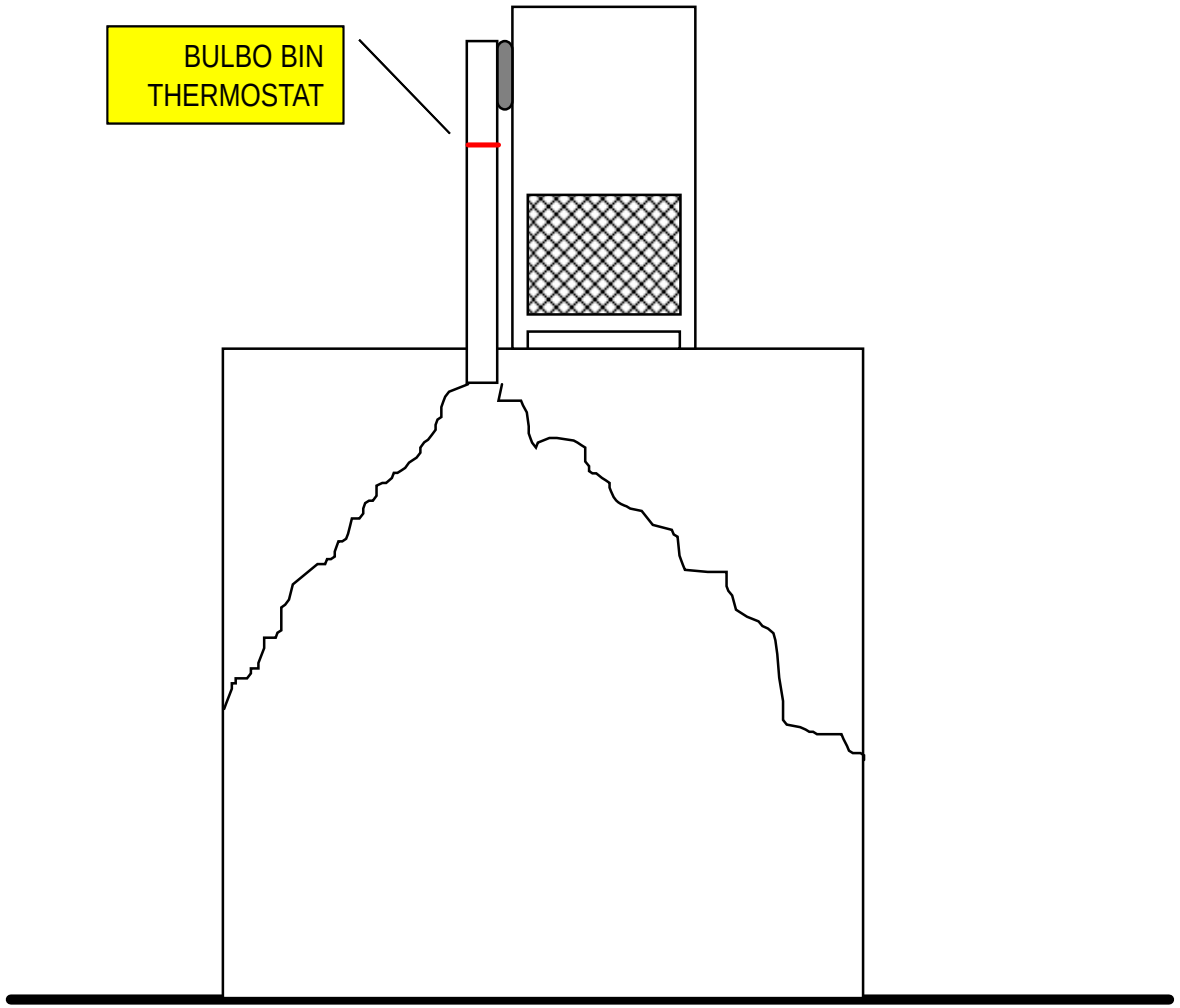


Scotsman®
Ice Systems

NEW MAR COMPACT SERIES

START UP CHECKING

Ice maker keep on operating untill ice level reachs ……



Scotsman®
Ice Systems

NEW MAR COMPACT SERIES

START UP CHECKING

……bin thermostat bulb

then compressor turn

OFF at first...

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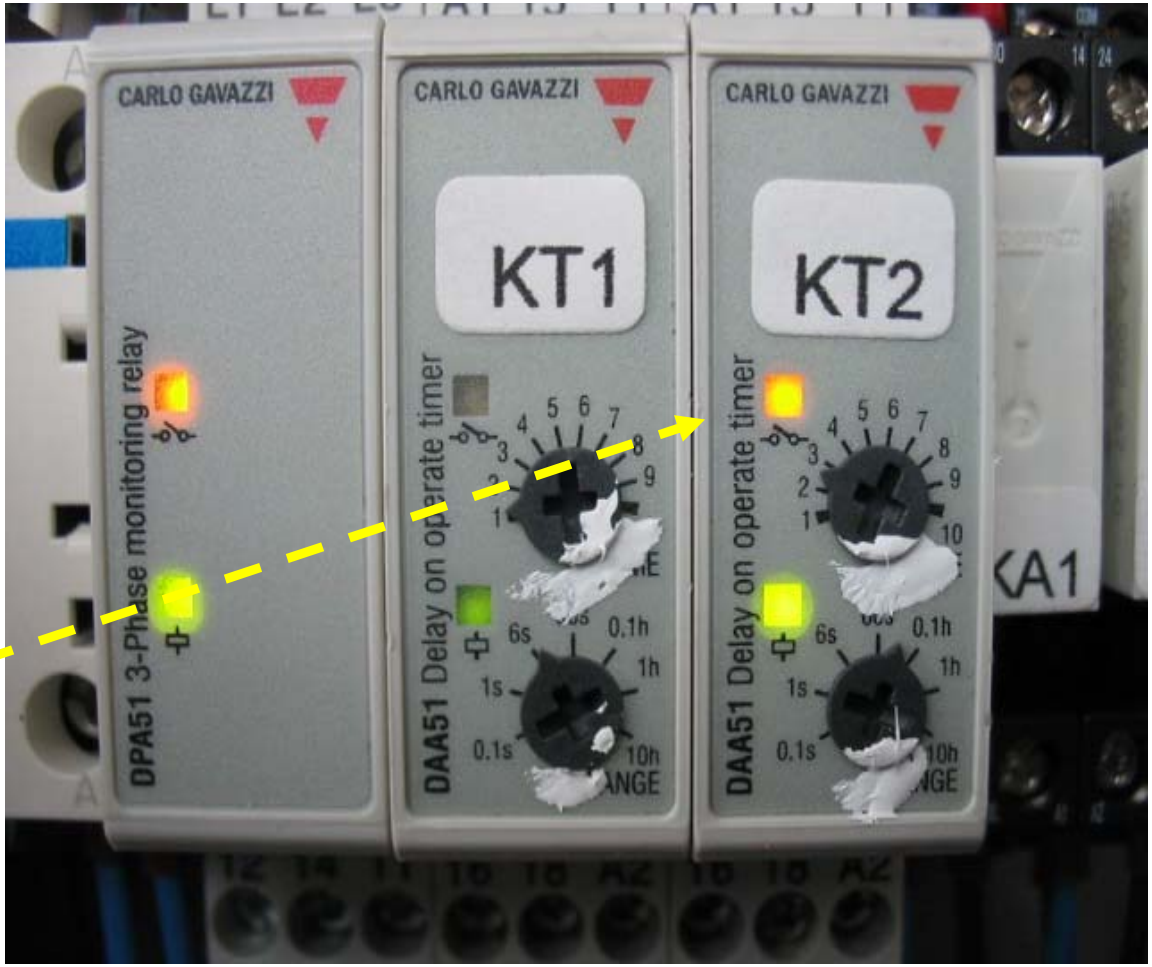
Ice Systems

NEW MAR COMPACT SERIES

START UP CHECKING

….and KT2 delay relay keep drive motor - gear reducer in operation for 18’ with orange LED blinking thus to clean the evaporator by ice then ice maker turns OFF



Scotsman®
Ice Systems

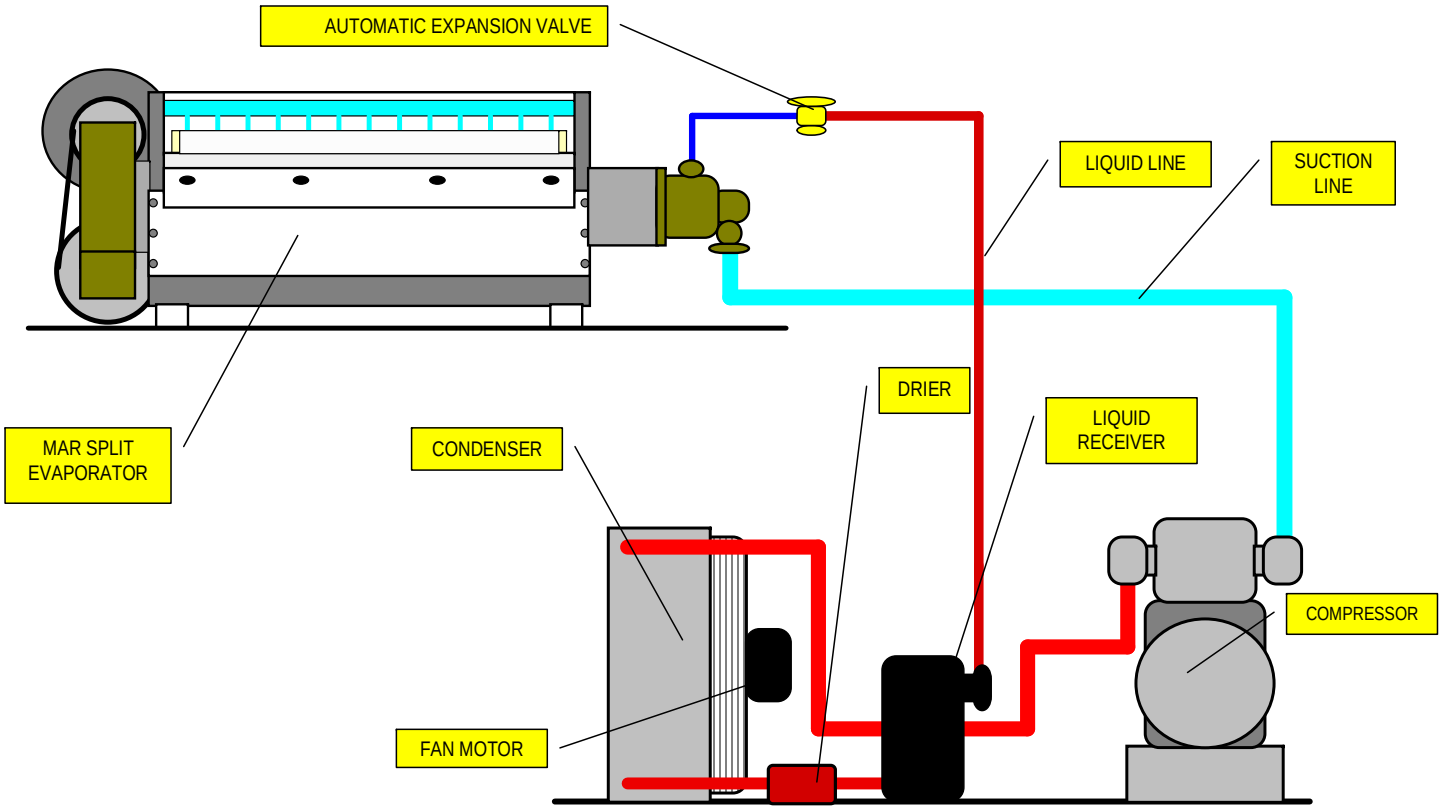
NEW MAR
COMPACT SERIES

OPERATING PRINCIPLES and COMPONENTS

Scotsman® Ice Systems

NEW MAR COMPACT SERIES

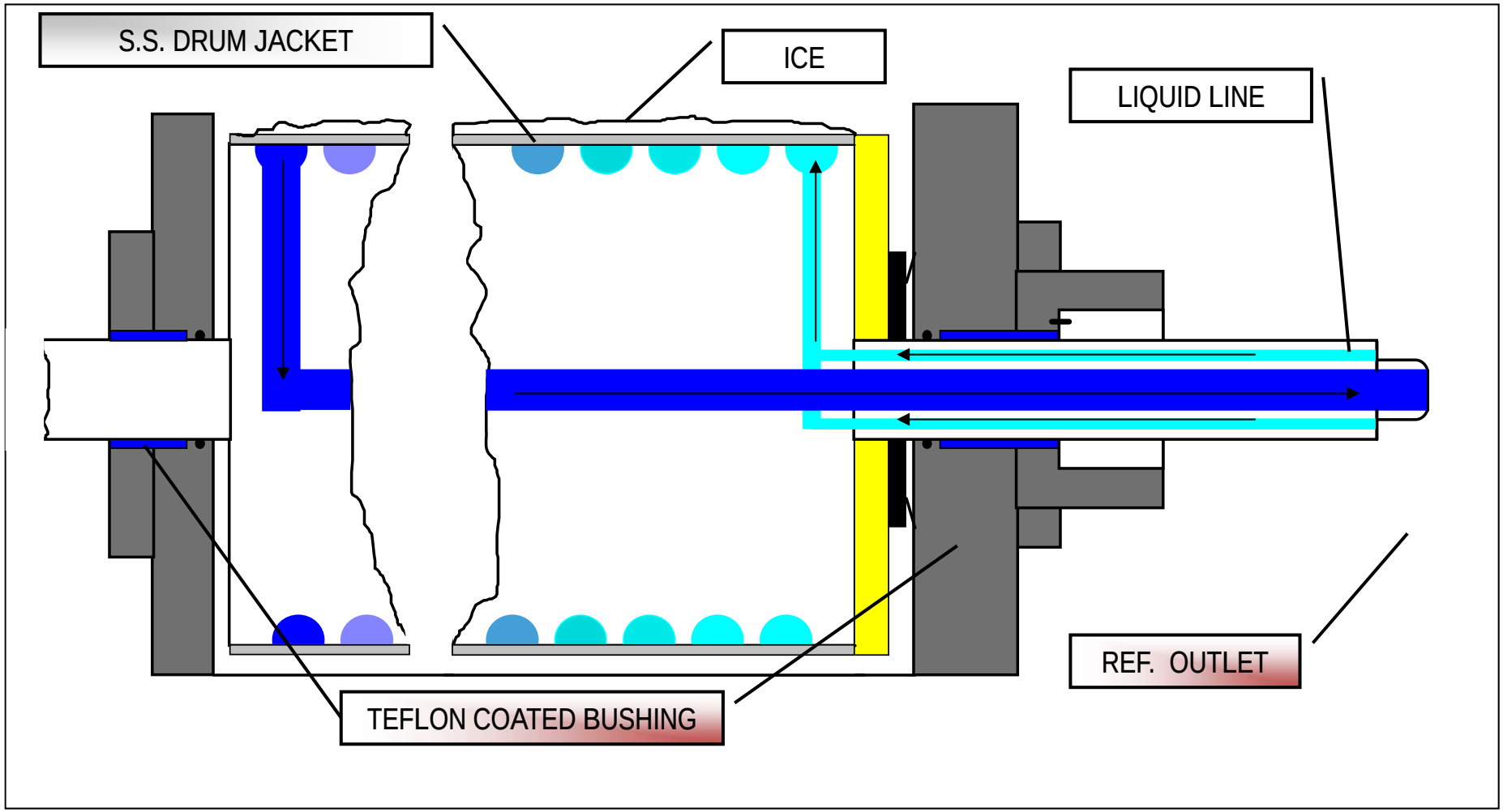
OPERATING PRINCIPLE – REFRIGERANT CIRCUIT COMPONENTS



Scotsman® Ice Systems

NEW MAR COMPACT SERIES

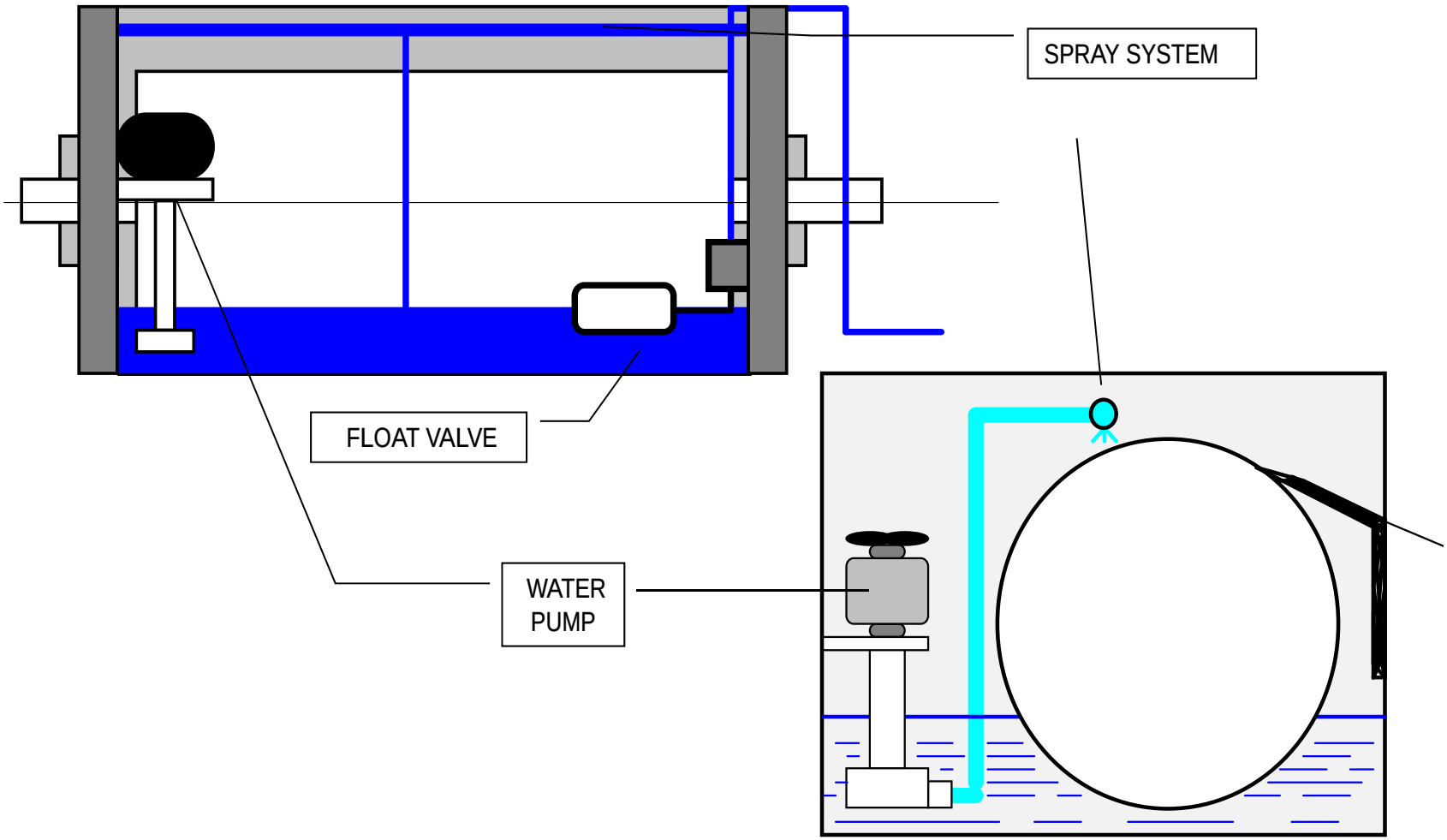
OPERATING PRINCIPLE – REFRIGERANT CIRCUIT COMPONENTS



Scotsman®
Ice Systems

NEW MAR COMPACT SERIES

OPERATING PRINCIPLE – WATER CIRCUIT



cotsman®
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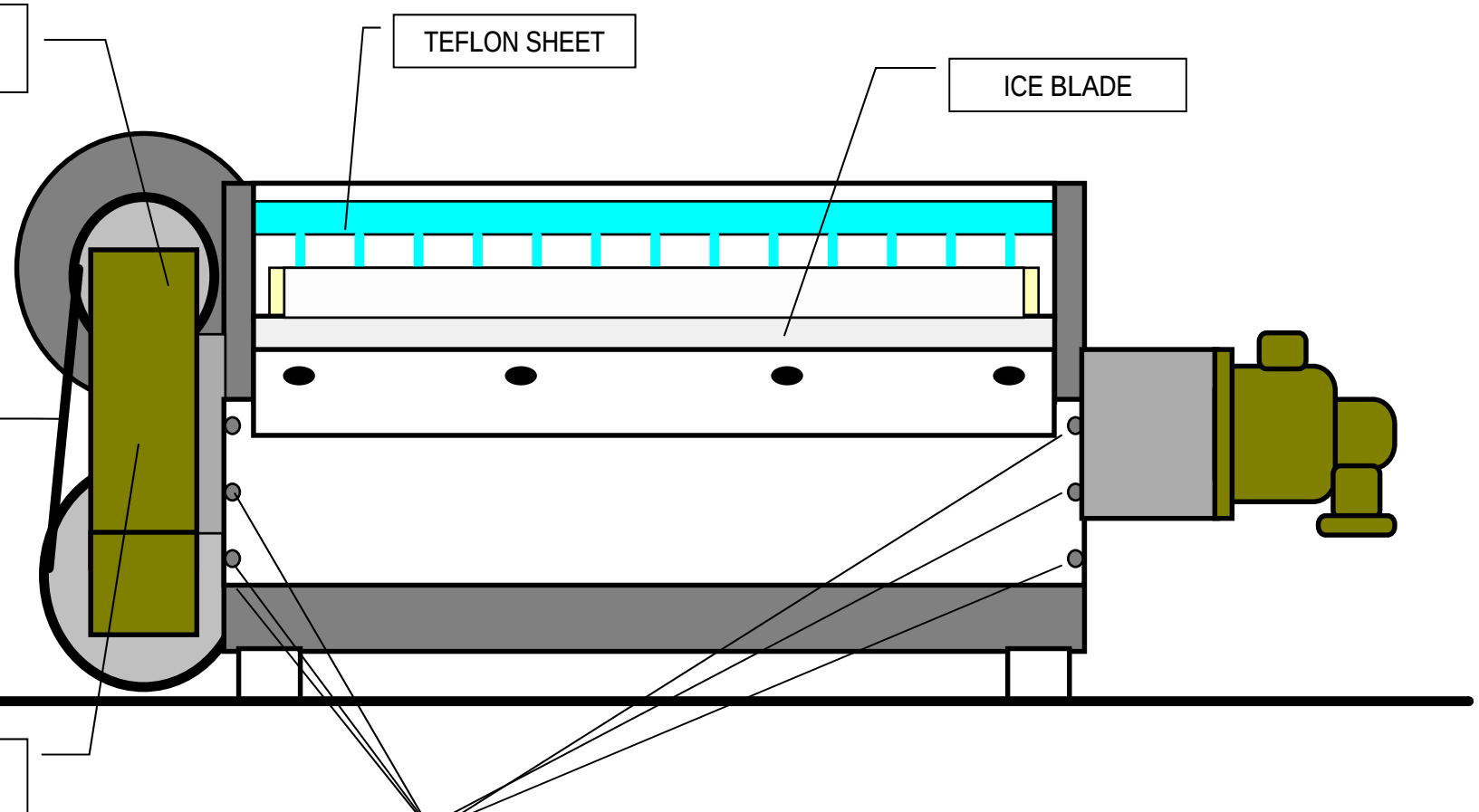
NEW MAR
COMPACT SERIES

OPERATING PRINCIPLE – MECHANICAL PARTS



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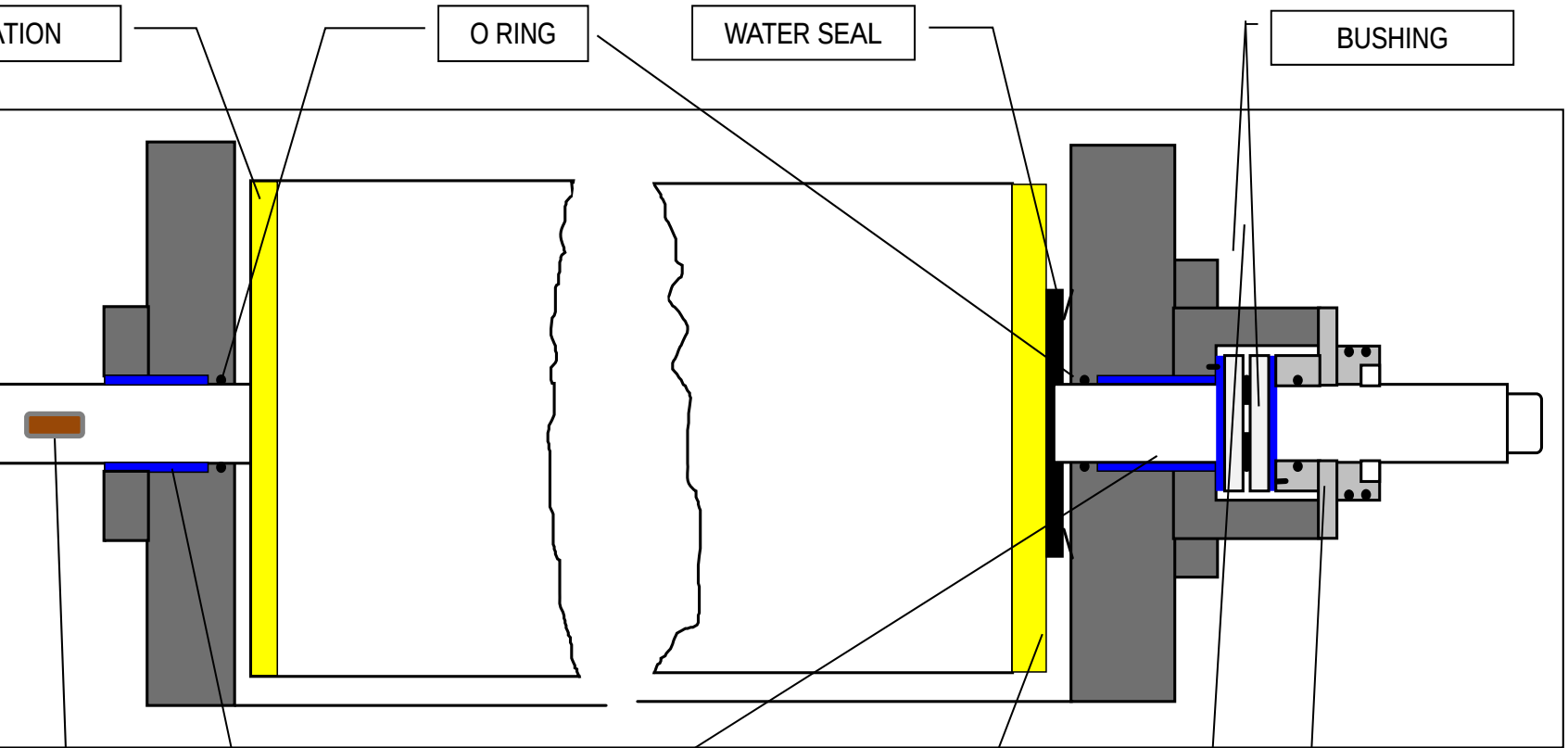
COMPACT SERIES

OPERATING PRINCIPLE – MECHANICAL PARTS



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OPERATING PRINCIPLE – REFRIGERANT CIRCUIT COMPONENTS

omponents of the
gerant system of the
series are
posed by:

PRESSOR

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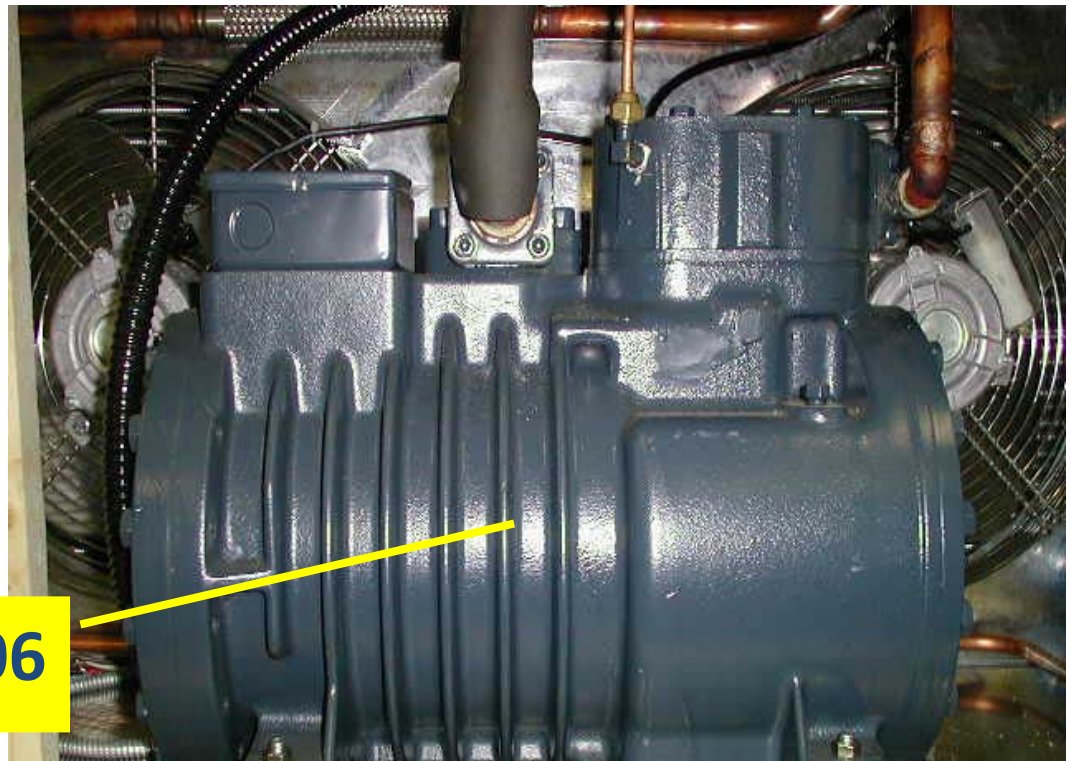
ystems

NEW MAR
COMPACT SERIES

OPERATING PRINCIPLE – REFRIGERANT CIRCUIT COMPONENTS

MPRESSOR



MAR 206 - 306

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NEW MAR
COMPACT SERIES

OPERATING PRINCIPLE – REFRIGERANT CIRCUIT COMPONENTS

NDENSER

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MOTE
NDENSER

ILY MAR 306)

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COMPACT SERIES

OPERATING PRINCIPLE – REFRIGERANT CIRCUIT COMPONENTS

MOTE CONDENSER
ILY MAR 306)

-cooled condenser mounted on the platform base with electrical
ction box, condenser shround, fan motors, fan protection grid and
o fan motor pressure controls

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COMPACT SERIES

OPERATING PRINCIPLE – REFRIGERANT CIRCUIT COMPONENTS

MAR 56 - 76 - 106 - 126

ATER COOLED CONDENSER

MAR 206 - 306

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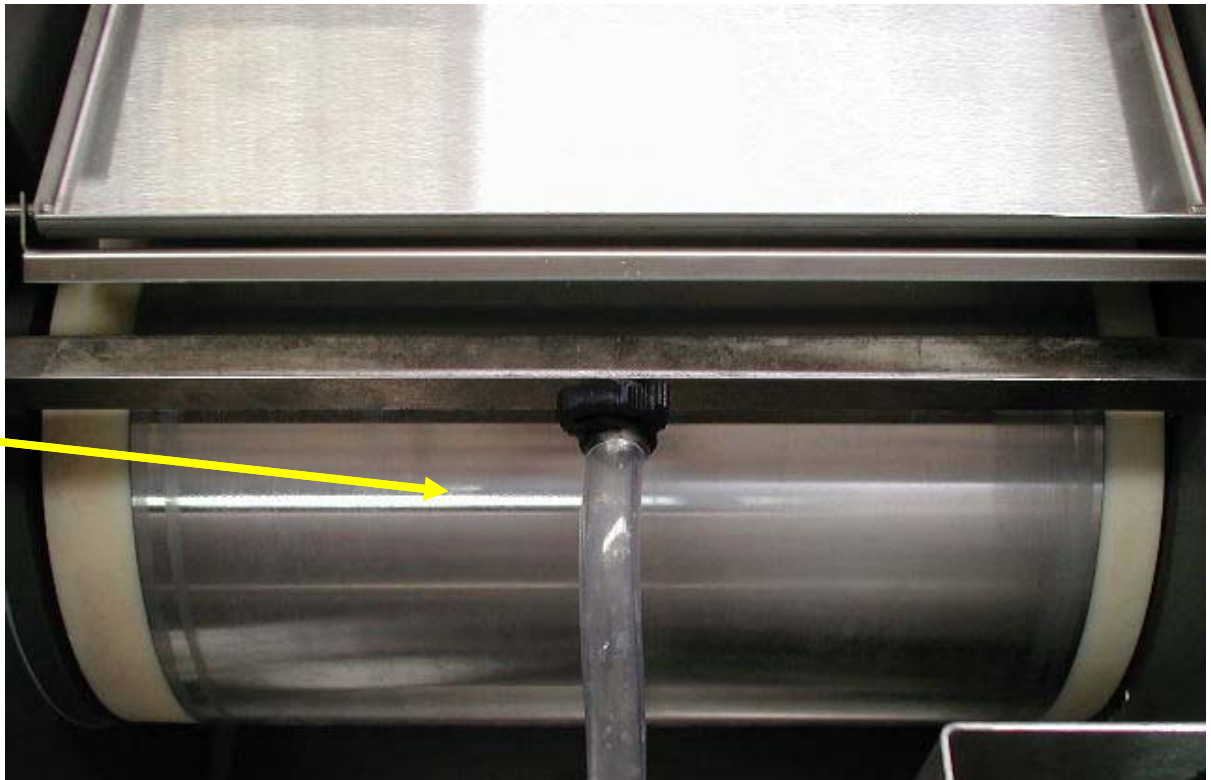
OPERATING PRINCIPLE – REFRIGERANT CIRCUIT COMPONENTS

PORATOR



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OPERATING PRINCIPLE – REFRIGERANT CIRCUIT COMPONENTS

AT EXCHANGER

duces flash gas in
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duces liquid
frigerant in suction
e

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COMPACT SERIES

OPERATING PRINCIPLE – REFRIGERANT CIRCUIT COMPONENTS

T GLASS

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OPERATING PRINCIPLE – REFRIGERANT CIRCUIT COMPONENTS

OMATIC EXP VALVE

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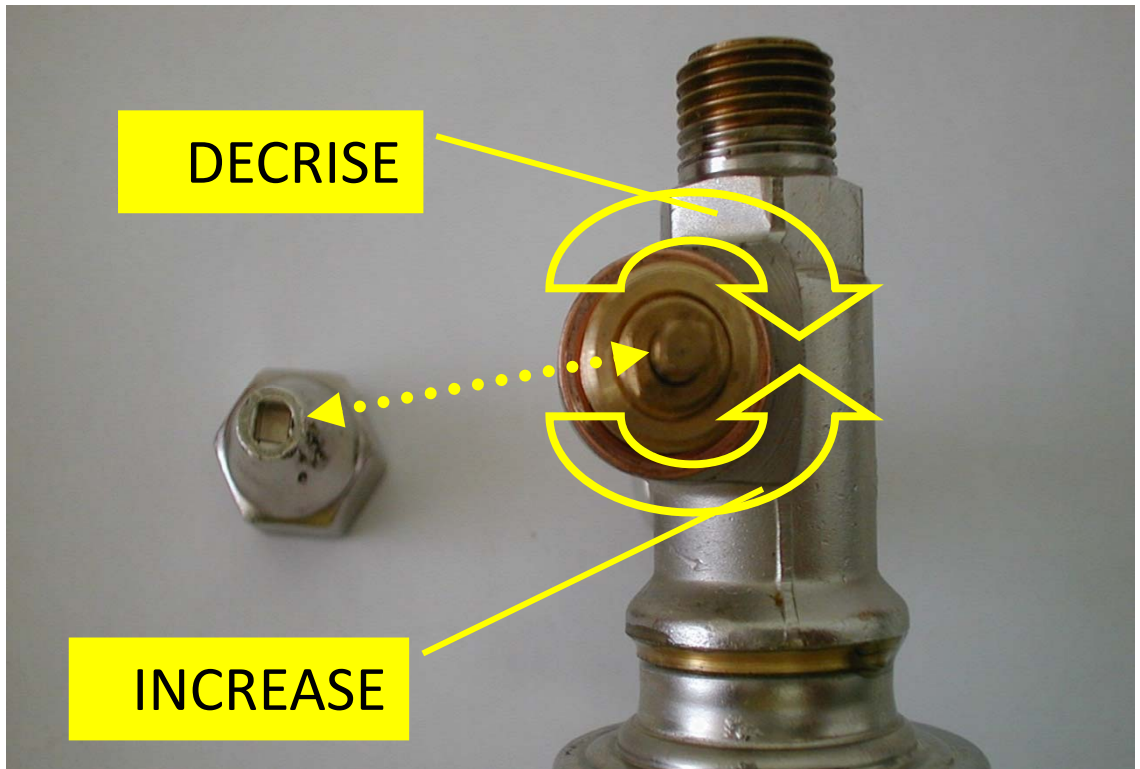
OPERATING PRINCIPLE – REFRIGERANT CIRCUIT COMPONENTS

OMATIC EXP VALVE
SETTING :

MAR 56→126

5 mm 3.0 bar

IAR 206 & 306



NEW MAR
COMPACT SERIES

OPERATING PRINCIPLE – REFRIGERANT CIRCUIT COMPONENTS

SEAL MECHANISM

NEW MAR
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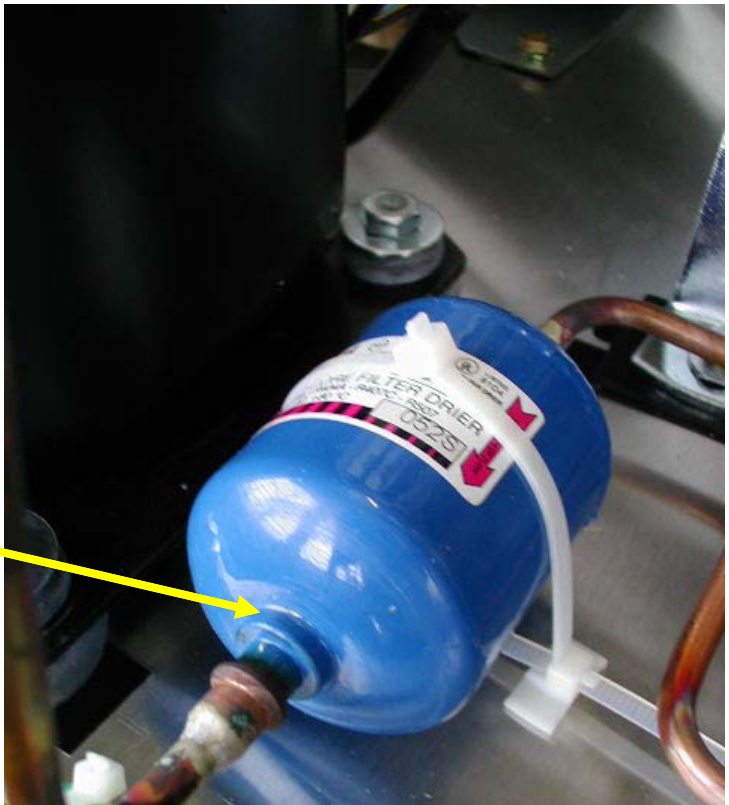
OPERATING PRINCIPLE – REFRIGERANT CIRCUIT COMPONENTS

ER



NEW MAR
COMPACT SERIES

OPERATING CYCLES – WATER CIRCUIT

DAT VALVE

NEW MAR
COMPACT SERIES

OPERATING CYCLES – WATER CIRCUIT

TER PUMP

NEW MAR
COMPACT SERIES

OPERATING CYCLES – WATER CIRCUIT

RAY BAR

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NEW MAR
COMPACT SERIES

OPERATING CYCLES – WATER CIRCUIT

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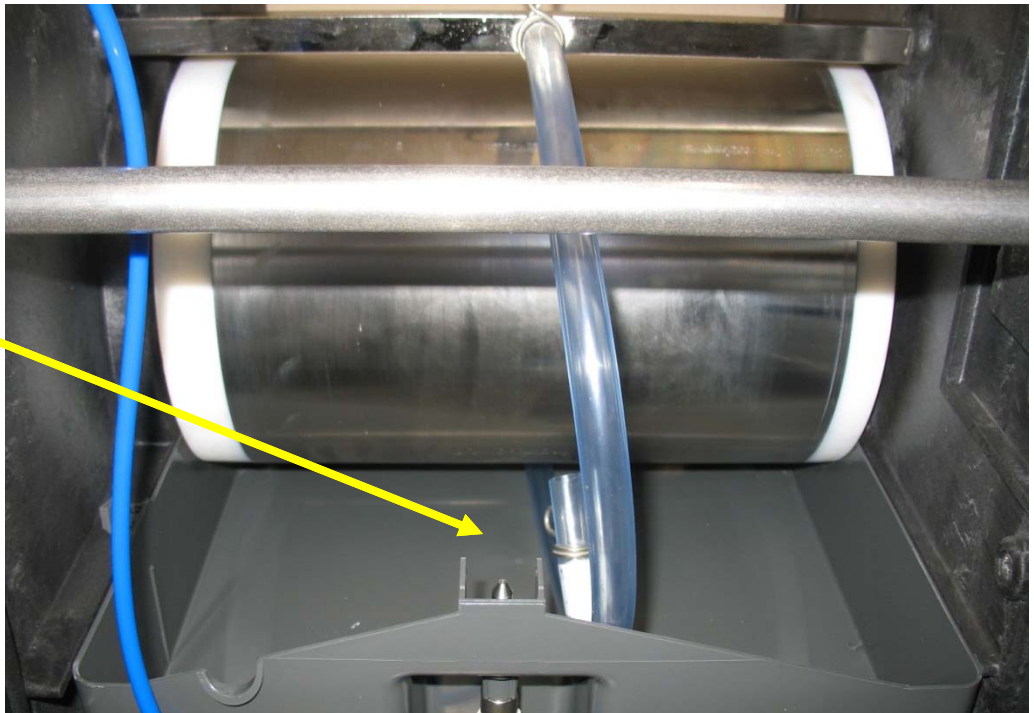
R 206 & 306



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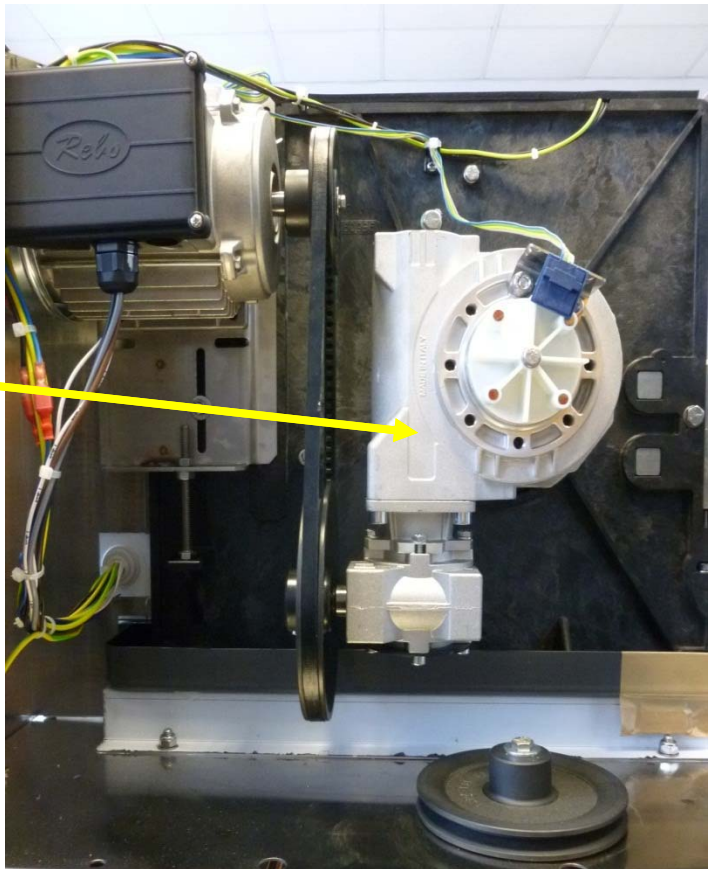
OPERATING CYCLES – WATER CIRCUIT

chanical parts:

AR REDUCER



R 56→126: 1/600
R 206 & 306: 1/552

TE: Gear reducer
icant is life lasting and

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COMPACT SERIES

OPERATING PRINCIPLE – MECHANICAL PARTS

PULLEYS & BELTS

	R.P.M. THICK ICE 2 mm	R.P.M. THIN ICE 1 mm
6 AS/WS	0.9	1.25
6 AS/WS	1.1	1.25
06 AS/WS	1.5	2.3
26 AS/WS	2.4	----
06 AS/WS	1.05	1.6
06 RC	1.6	2.9

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OPERATING PRINCIPLE – MECHANICAL PARTS

R KEY

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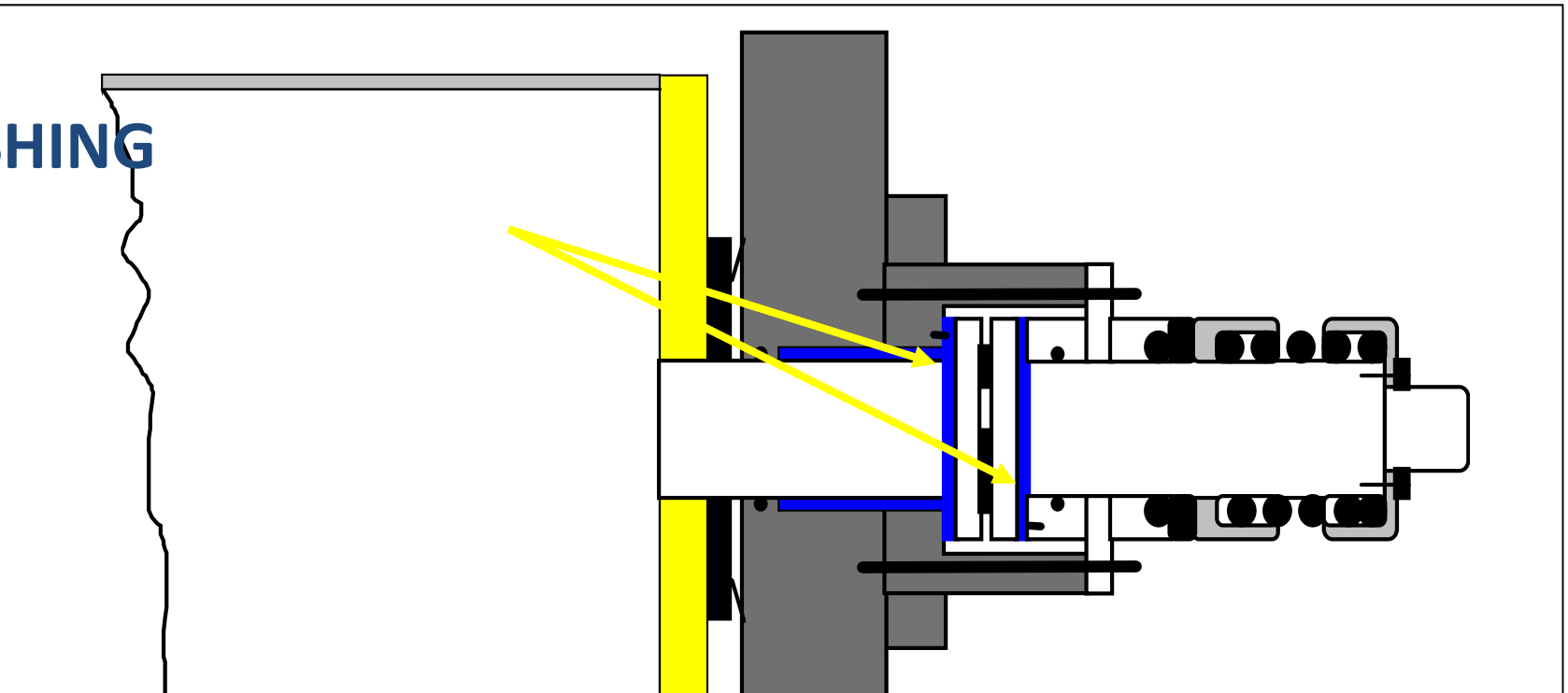
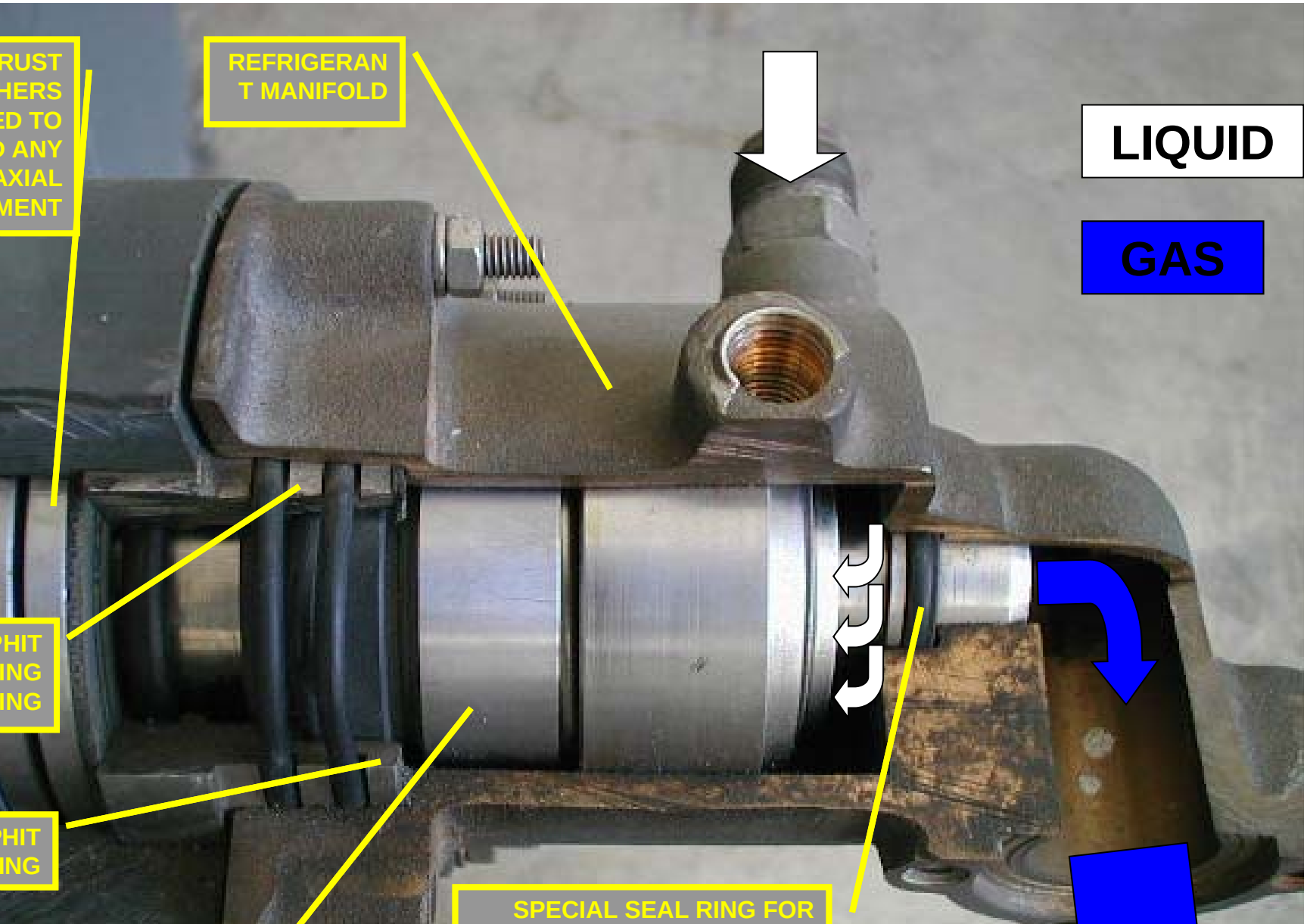
OPERATING PRINCIPLE – MECHANICAL PARTS

SHING

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OPERATING PRINCIPLE – MECHANICAL PARTS

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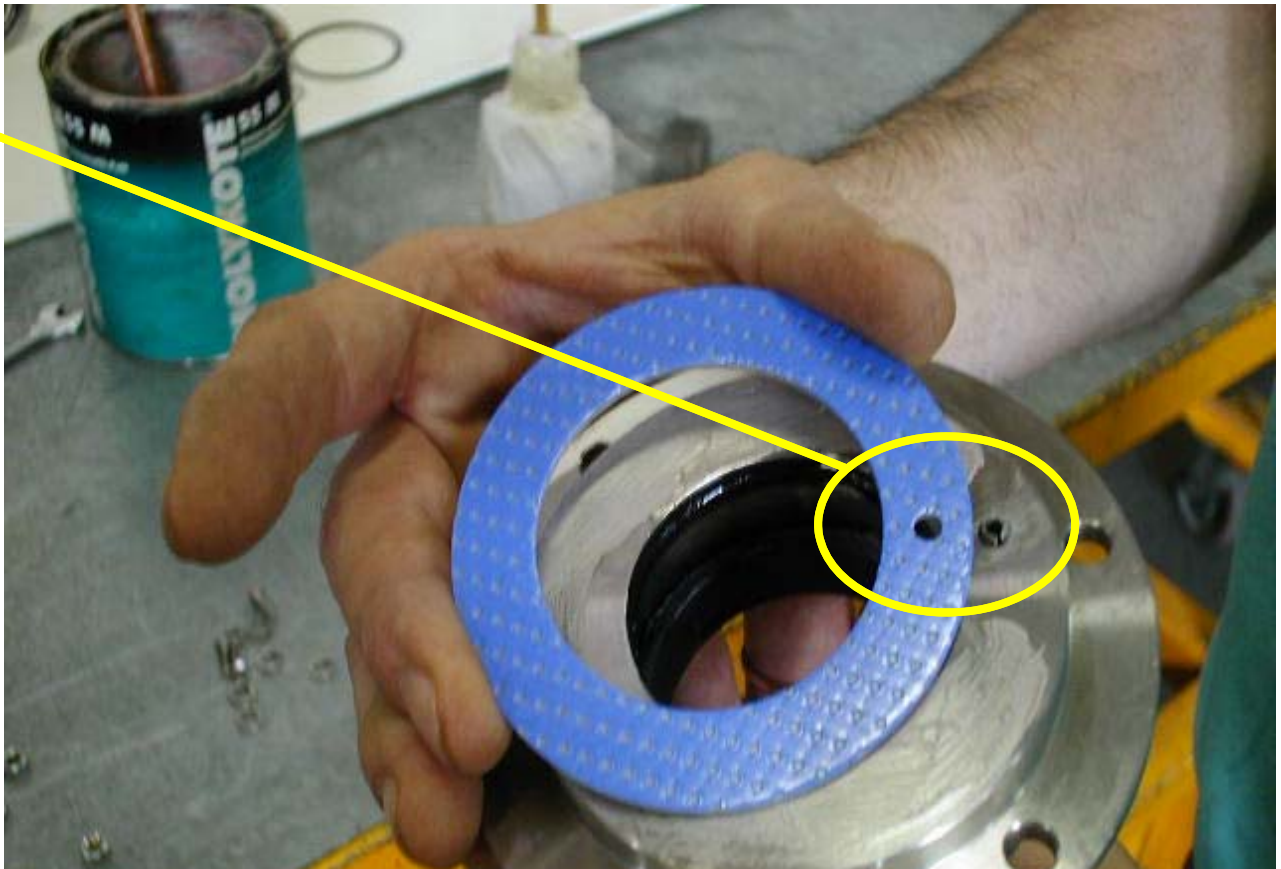

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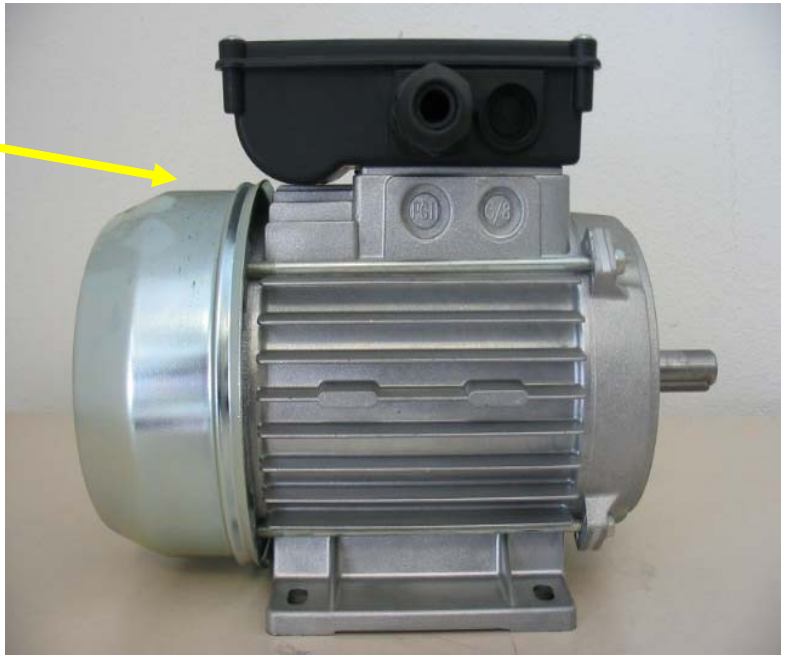
OPERATING PRINCIPLE – ELECTRICAL COMPONENTS

VE MOTOR

- /2 HP
- 00/230 Volt
- 0/60 Hertz
- 2/2,1 Amp
- 400 R.P.M. WITH
- RMAL PROTECTION
- E: ROTATION MUST BE



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OPERATING PRINCIPLE – ELECTRICAL COMPONENTS

MOTOR/S

M: 1300 (1560)

ATT: 70

IP: 0.7

0V/50-60Hz/1Ph

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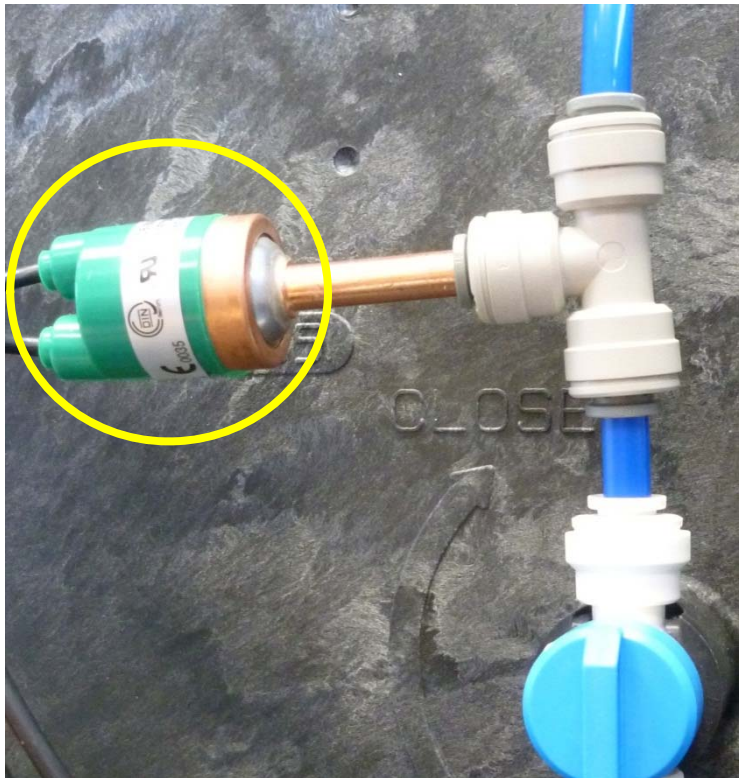
OPERATING PRINCIPLE – ELECTRICAL COMPONENTS

ER PRESSURE CTL



bar (7psi) OFF

bar (12 psi) ON

TOMATIC RESET

NEW MAR
COMPACT SERIES

OPERATING PRINCIPLE – ELECTRICAL COMPONENTS

SPOUT SWITCH

THE UNIT OFF
ENLY AS SOON AS
ACH /STACK AT ICE
T AREA

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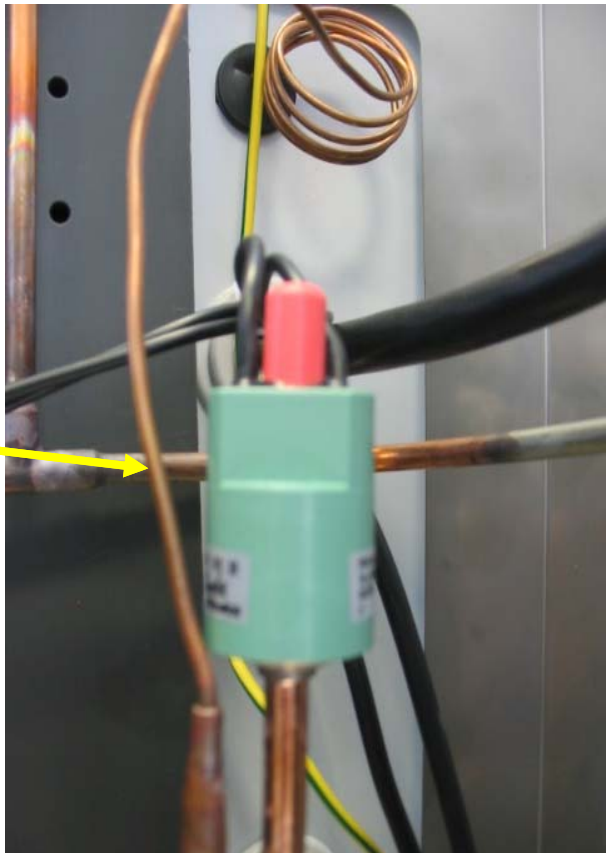
OPERATING PRINCIPLE – ELECTRICAL COMPONENTS

RESSURE CTL



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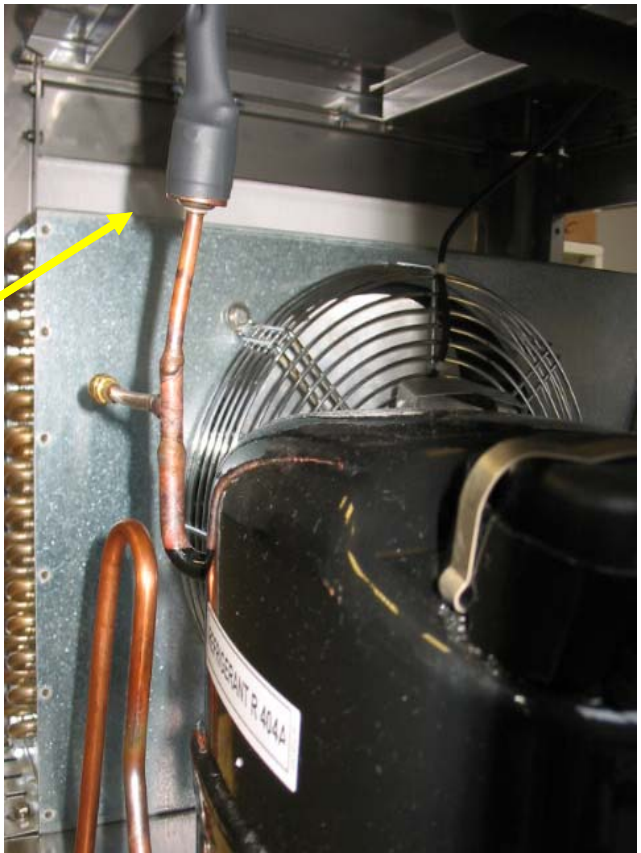
PRESSURE CTL



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THERMOSTAT

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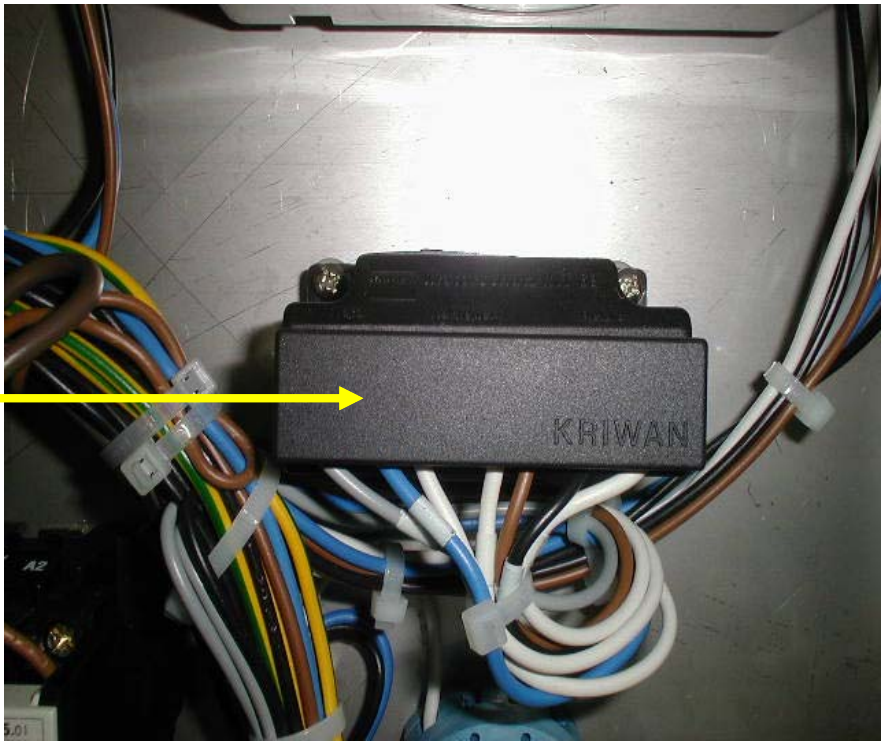
IPRESSOR
TECTOR



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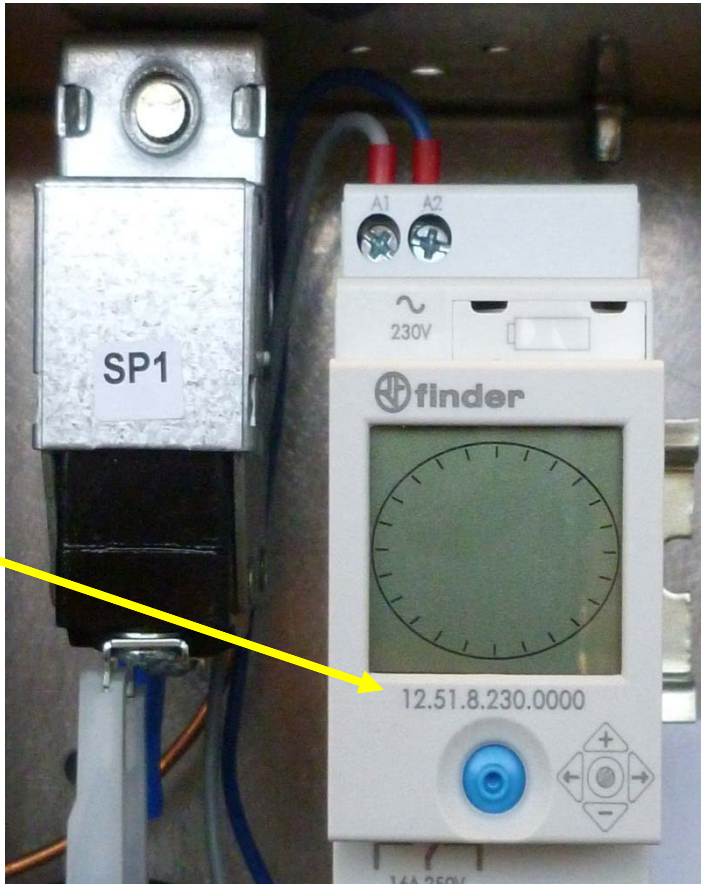
TAL TIMER



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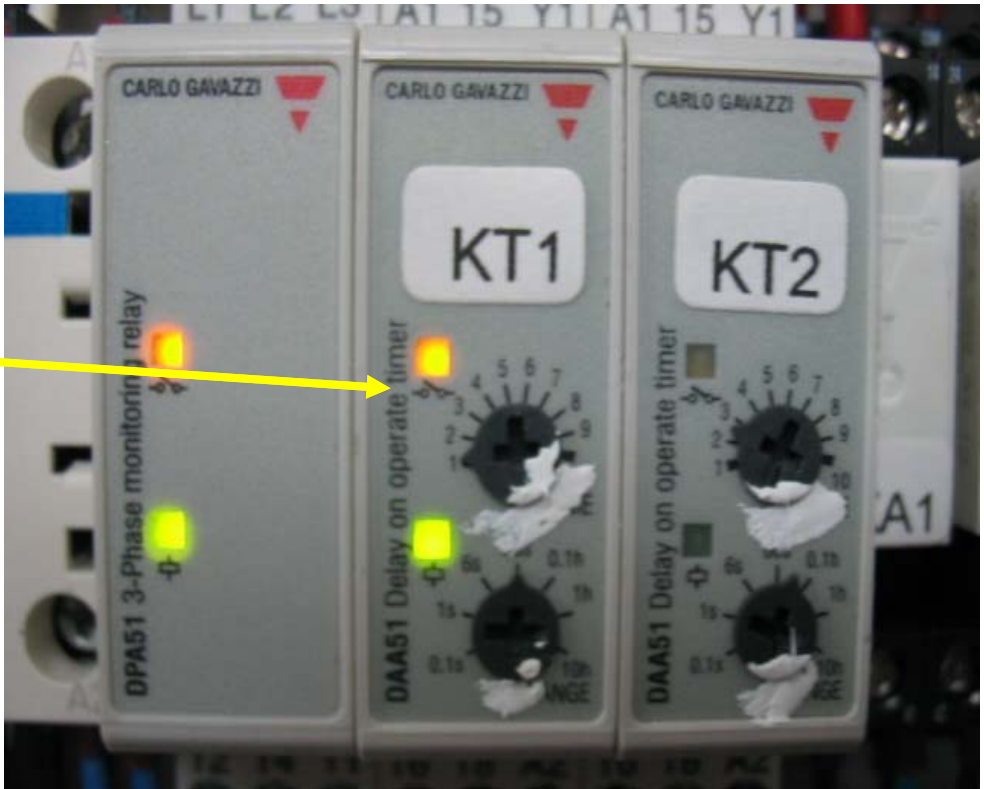
TIME DELAY



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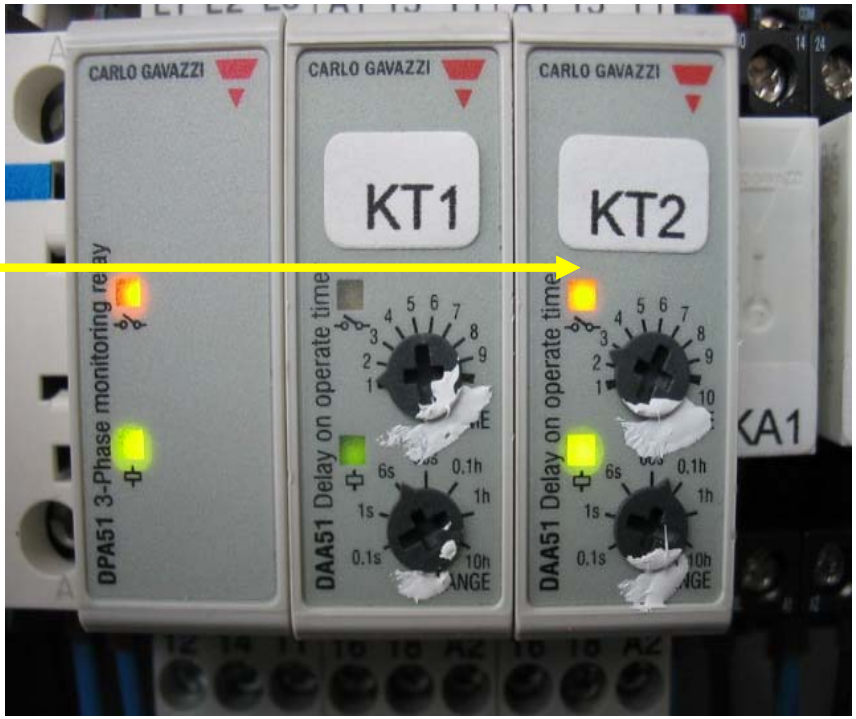
TIME DELAY



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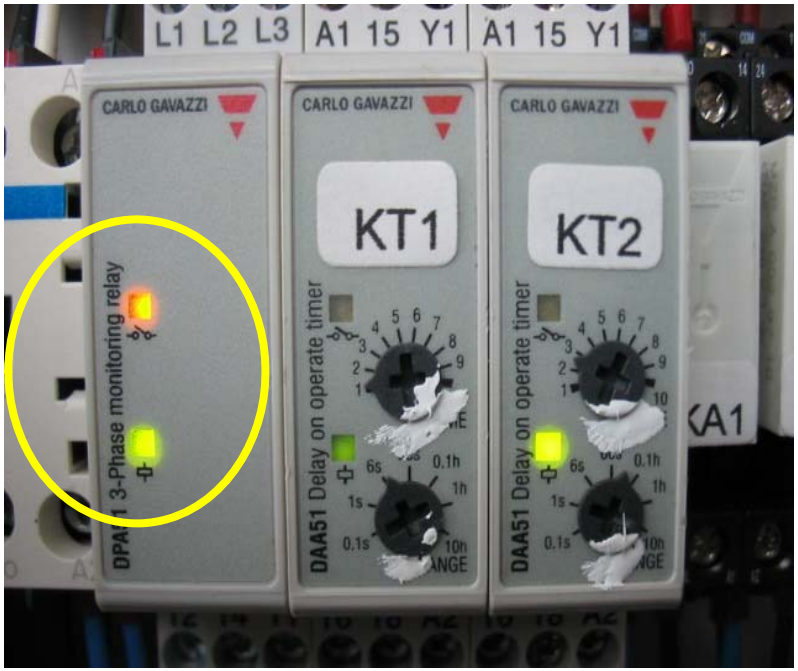
ASE MONITORING RELAY



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PRESSURE CTRL

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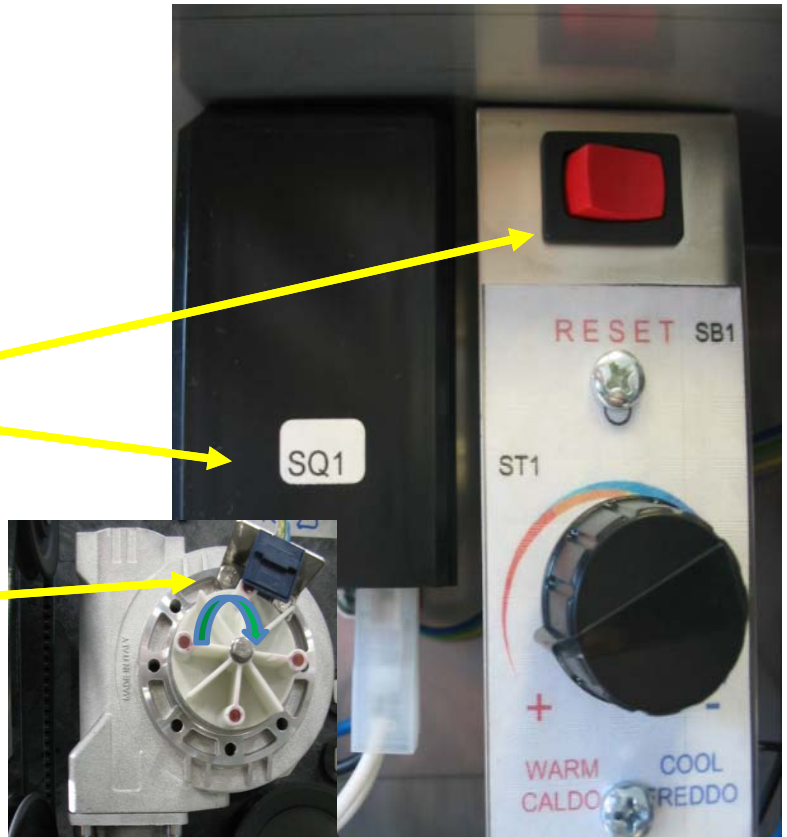
OPERATING PRINCIPLE – ELECTRICAL COMPONENTS

UM ROTATION
NTROL BOARD &
ET PUSH BUTTON

ck the evaporator
ning by the mean of
ct hall sensor
ch has to detect pin
ed of max 40’’ each



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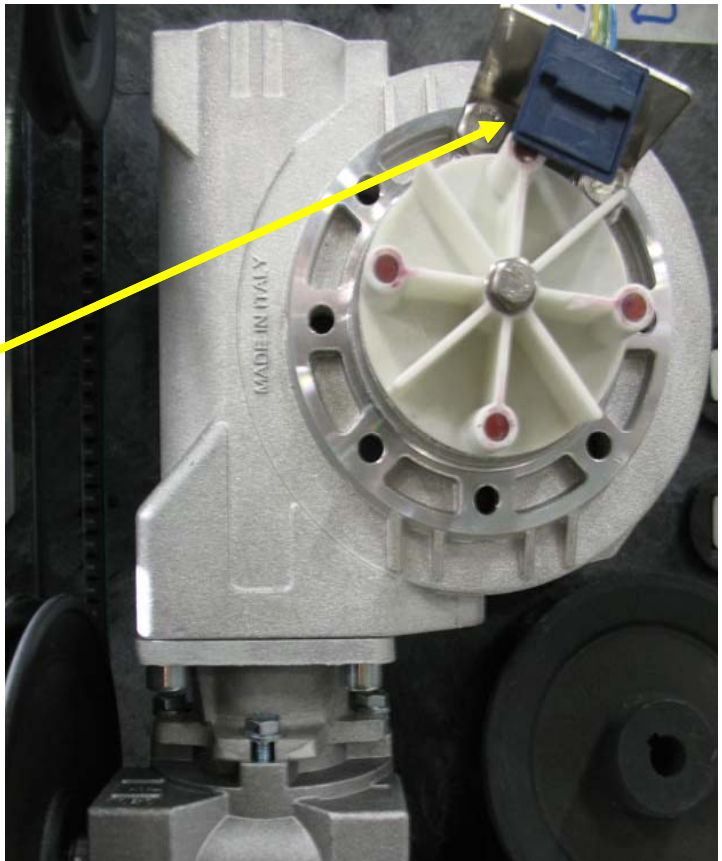
CT HALL SENSOR



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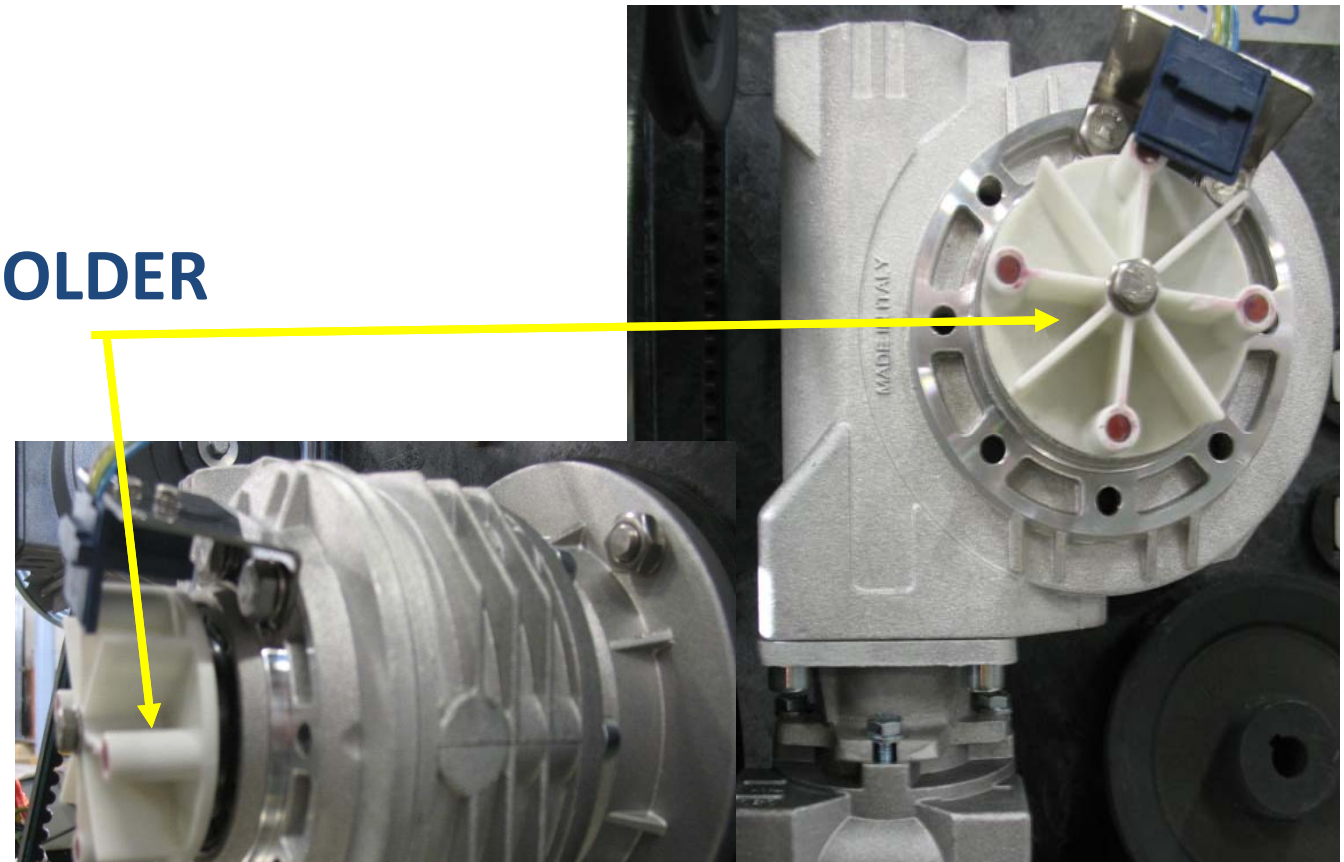
GNET HOLDER



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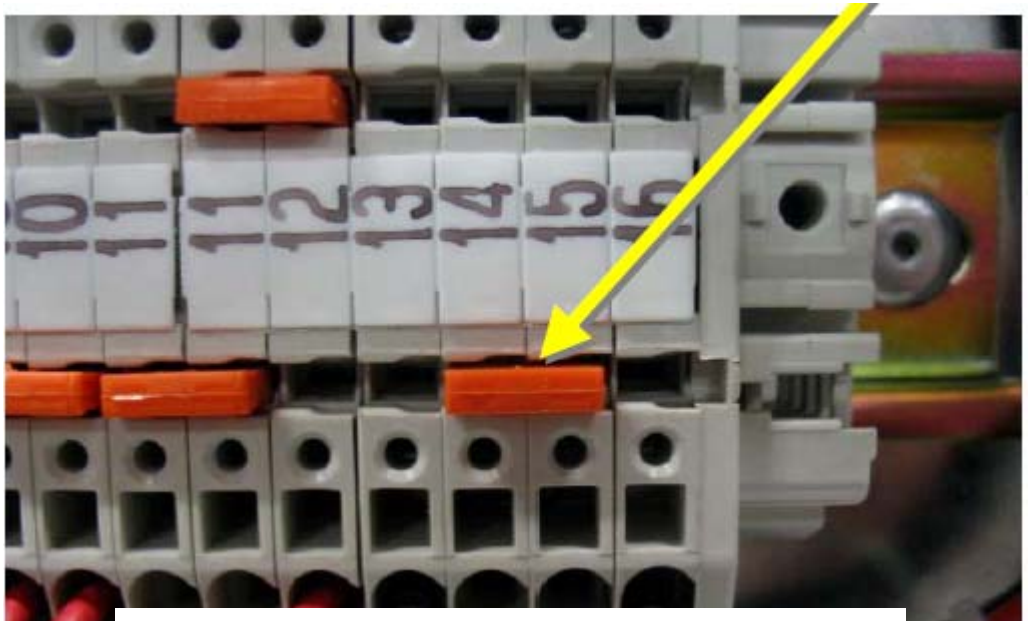
RMINAL PLUG

N/C contact



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NTROL PANEL


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END
FIRST HALF