



Fire Fighting Systems

with EN 12845 standard

THE FIRE FIGHTING SYSTEMS IN ACCORDANCE WITH UNI EN12845 GENERALITY

The standard EN12845 deals “fire extinction fixed plants - sprinkler automatic systems - Design, installation and maintenance”; this standard so harmonizes at European normative level the anti fire plants execution using sprinkler, establishing besides how the water pumping systems for anti fire use must be manufactured that will be installed in the whole European territories, through a sprinkler anti fire hydraulic nets service (or hydrants).

The first indications about the anti fire groups that the EN12845 shows, refer to the pump typology to use; in detail **the standard EN12845 requests that the pump has a steady curve, that is a curve** where (a) the maximum predominance = predominance in shut-off and (b) the total predominance reduces when the capacity increases (with reference to EN 12723).

The motors that activate the pump must supply the power necessary to respect what follow:

- a) for the pumps with power characteristics curves without overloading, the requested maximum power at the power curve peak;
- b) for the pumps with increasing power characteristics curves, the maximum power for any pump loading condition, from the zero capacity to the capacity corresponding to a requested pump NPSH equal to 16 m or to the suction maximum pressure more 11 m, what between them is major.

- **the joint** between the motor and the horizontal axle pump must be such to **assure that both can be removed independently** so that the pump internal parts can be changed without involve the suction or turn pipes.
- The **pipes** must have **dedicated supports and independently from the pump**.
- The **pumps** with axle suction (end suction) must have the **rotating part extractable** motor side (back pullout).

If **two pumps** are installed, each must supply independently the requested capacities and pressures.

If **three pumps** are installed, every pump must be able to supply at least 50% of the requested capacity to the design pressure.

In a **superior or double hydraulic feeding**, when many pumps are installed, only one of them must be driver from an electric motor.

The used water maximum temperature must not exceed 40°C; if **submerged pumps** are used, the water temperature **must not exceed 25°C**, except if the motor suitability has

been proved for temperatures up to 40°C.

In the pump suction and turn pipes **interception valves** must be placed, while in the turn pipes a **not return valve** must be inserted.

The **valves** on the turn must be placed after any conic pipe. If the pump isn't able to leak automatically the air container in its body, a **leak system** must be foreseen.

It is necessary to create besides some **devices to safeguard the pumps** if closet turn functions (water circulation device); the above described water flow must however be taken into consideration in the pump choice and in the plant hydraulic calculation.

The **circulation discharges** must be visible and cannot be interconnected in the case of more pumps.

Installation

For what possible horizontal axle spin drier pumps, **installed under heading** in line with what follows:

- **at least two third of the effective capacity of the anti fire water accumulation tank must be over the pump axle level;**
- **the pump axle must not be more of 2 meters over the water X minimum level in the anti fire water accumulation tank (EN 12845, point 9.3.5).**

If it isn't possible the installation as above described, the pump can be installed over heading or the vertical pumps can be used immersed on axial flow.

The pump suction must be connected to a pipe long at least twice the diameter, upright or conic; the possible conic pipe must be eccentric type with the horizontal superior side and a maximum opening angle that doesn't exceed 15°. It **isn't possible to install the valves directly on the pump suction mouth**.

The suction pipes must be placed horizontally or with positive slope towards the pump to avoid the possible formation of air pockets in the piping.

The suction pipe, included all valves and joints, must be sized so that the NPSH, available to the pump entry, exceeds the requested NPSH of at least 1 m with the requested maximum capacity and to the water maximum temperature (NPSHd > NPSHr+1) (EN 12845 - Table 14).

When the pump axle is over the water minimum level a bottom valve must be installed (EN 12845 point 9.3.5).

Under heading installation

If the installation is under heading, the suction pipe must not be inferior to DN65, besides the pipe must be sized because the speed doesn't exceed 1,8 m/s with the pump that functions with the requested maximum capacity.

Where more pumps are installed, the suction pipes can be interconnected if they are supplied with interception valves (with the aim to allow to every pump to function when the other one is removed).

Over heading installation

In the over heading installation, the suction pipe must not be inferior to DN80; besides the pipe must be sized because the speed doesn't exceed 1,5 m/s with the pump that functions with the requested maximum capacity.

Where more pumps are installed, the suction pipes must not be interconnected.

The pump axle height from the water minimum level (calculation in EN 12845 point 9.3.5) must not exceed 3,2 m. The suction pipe from tank or reserve must be produced in conformance with what showed in the figure 4 and table 12 or in figure 5 and table 13 (EN 12845), as appropriate.

In the lower point of the suction pipe a bottom valve must be installed and every pump must be connected to an automatic device with separated priming.

This pump automatic priming device installed over heading must be produced as showed in figure 6 (EN 12845).

The priming tank, the pump and the suction pipe must be constantly full of water also in presence of falls from the bottom valve.

If the water level in the tank would go down to 2/3 respect to the normal level, the pump must start.

The minimum capacities of the priming tank and priming pipe must be in conformance with the table 15 (EN 12845).

Pre calculated systems - LH and OH

When the pumps take water from an accumulation tank, the LH and OH pre calculated systems characteristics are detailed in the Table 16 (EN 12485).

Pre calculated systems - HPP and HHS without sprinkler inside the shelves

For the HPP and HHS pre calculated systems the capacity and the pump nominal pressure are imposed and are showed in the chapter 7.3.2; besides the pump must supply 140% of this capacity to a pressure not inferior to 70% of the pressure to the project pressure.

Systems calculated integrally

The pump nominal performance must be in function of the more unfavorable area curve. Measured in the test room, the pump must supply a pressure of at least 0,5 bar superior to that one requested for the more unfavorable area.



The pump must also supply the capacity and the more favorable area pressure for all water levels of the hydraulic reserve (see figure 7 - EN 12845)

Manostats

Two manostats are necessary to make function each pump; they must be connected in serial with contacts normally closed, so that the contacts opening of one of the manostats will start the pump. The connection pipe to the manostats must be at least from 1/2".

Pump starting

The first pump must start automatically when the pressure in the hydraulic net goes down to a value not inferior to 0,8 P, where P is the closet turn pressure. If two pumps are installed, the second one must start to a value not inferior to 0,6 P. when the pump is started it must continue to function up to when it is stopped manually.

Manostats verification

Some devices must be prepared to verify the pump starting with every manostat.

Electric pump control panel

The pump control panel must:

- start automatically the motor when receives a signal from the manostats;
- start the motor with manual activation;
- stop the motor only through manual activation.

(If the pumping system is for exclusive use of the hydrants net, for activities not constantly garrisoned, the automatic stop is admitted, it can happen after that the pressure is maintained constantly over the pump starting pressure for at least 20 min consecutive - UNI10779:2007).

The control panel must be supplied with amperometer and in case of submerged pumps; on the panel a plate must be

fixed with the pump characteristics.

Except when submerged pumps are used, the pump control panel must be placed in the same pump and electric motor compartment.

The panel must check the following pump conditions (annex I - EN 12845):

- electric feeding availability to the motor and, when alternated (AC) on all three phases
- pump starting request
- pump in function
- lacked starting

All checked conditions must be showed visually and singularly in the pump room, and must be also showed visually in a permanently protected place. "Pump in function" and "anomalies alarm" must be signalled acoustically in the same protected place.

The anomaly visible indication must be of yellow colour, the acoustic signals must have a signal level of at least 75 dB and must be silenced.

It needs to foresee a test system for the signalling lamps control.

Motor pumps

The diesel motor must function in continue way on full load, to the installation quote, with a continue nominal power in conformance with the ISO 3046; it must be manufactured in conformance with the paragraph 10.9 (EN 12845).

The pump must be perfectly operative within 15 seconds from the beginning of every starting sequence. The horizontal pumps must have a direct transmission.

The fuel tank must be adequately sized to guarantee the following full load autonomies:

- 3 hours for LH (light risk)
- 4 hours for OH (ordinary risk)
- 6 hours for HHP and HHS (high risk)

The fuel tank must be of welded steel and where more motors are present, a tank and a fuel feeding pipe must be foreseen independently for each motor. It however must be produced in conformance with the paragraph 10.9.6; this tank must feed for gravity the injection pump, but it must not be placed directly over the motor.

Starting mechanism

The motor pump starting systems must be two and independently between them: automatic and manual.

While the diesel motor must be possible to start both automatically, on call from manostats, both manually through a button on the pump control panel, the motor stop must be possible only manually (if the pumping system is on exclusive use of the hydrants net, for activities not constantly controlled the automatic stop is admitted, it can happen after that the pressure is maintained constantly over the pump starting pressure for at least 20 min consecutive - UNI10779:2007); the motor monitoring devices must not stop the motor.

The automatic starting must perform on sequence of six mo-

tor starting attempts (each $5\text{sec} < t < 10\text{sec}$ with a maximum pause of 10sec between every attempt).

The system must function independently from the power electric line feeding and must commute automatically on the other battery after every starting attempt.

Emergency manual starting system

A device with breakable cover must be foreseen for the emergency manual starting with feeding from both the batteries.

Test devices for the manual starting system

To allow the periodical verification of the manual electric starting system, without break the breakable cover of the emergency manual starting button, a test button and a bright gauge must be foreseen, the system must function in accordance with the logic of the paragraph 10.9.7.4 (EN 12845).

The specifications that the starter must respect are showed in the paragraph 10.9.7.5. (EN 12845).

Electric starter batteries

The batteries must be used only for this purpose, must be two and separated; open type with prismatic rechargeable cells with nickel-cadmium, in conformance with the EN 60623 or lead accumulators in conformance with the EN 50342. Also a densimeter must be provided for the electrolyte density control.

Every starting battery must be supplied of an independent battery charge, always connected, completely automatic and stabilized.

Starting alarm indication

The following conditions must be showed locally and in a place permanently supervised (see annex I):

- a) the use of any electric device that prevents the motor automatic starting;
- b) the lacked motor starting after six attempts;
- c) pump in function;
- d) diesel motor control panel damage;

The warning bright lights must be adequately countersigned.

Motor check and exercise

Every pumping group must be checked from the supplier for a time not inferior to 1,5 hour to the nominal capacity.

What follow must be registered on the test certification:

- a) the motor speed with the closed lock pump
- b) the motor speed with the pump supplying the nominal capacity
- c) the closed lock pump pressure
- d) the suction prevalence to the pump entry
- e) the pressure at the pump exit to the nominal capacity forward of any lock diaphragm
- f) the environment temperature
- g) the cooling water temperature increase after 1,5 hour of fun-

- cting
- h) the cooling water capacity
- i) the lubrication oil temperature increase at the end of the fu
ctioning test
- j) in the cases where the motor is supplied with a heat exchan-
ger the initial temperature and the cooling water temperature
increase in the motor closed circuit.

Put in service test in site

See also the paragraphs 19.1.3. and 20 (EN 12845)

When a plant is put in service, with the excluded fuel feed-
ing, the diesel motor automatic starting system must be di-
sconnected (six cycles, each not inferior to 15 seconds with
the starter functioning and pause included between 10 and
15 seconds).

After six starting cycles the motor lacked starting alarm must
be activated. Successively when the fuel feeding is restored,
the motor must function when the manual starting test button
is activated.

Locals for fire fighting systems

The pumping groups must be installed in locals having a fire
resistance not inferior to 60 minutes, used only for the anti
fire protection. **One of the following must be** (in order of
preference):

- a) a separate building
- b) a building near to a building protected from sprinkler with
direct access from the external.
- c) a local within a building protected from sprinkler with di-
rect access from the external.

Sprinkler protection

The locals for the pumping groups with sprinkler nets service
must be protected through sprinkler.

Where the anti fire pumps local is insulated, could be
impassable supply the sprinkler protection from the control
station groups presented in the buildings.

The sprinkler protection can be supplied from the nearest
point on the bottom of the not return valve placed on the
pump lock through a further interception valve blocked in
open position and couplet to a blood flow meter in accordance
with EN 12259-5, to supply a visual and acoustic indication
of the sprinkler functioning (the dedicated detach diameter
to the sprinkler protection will be variable in accordance with
the area to cover through the sprinkler).

The alarm device must be installed on the control stations or
in a place constantly supervised (example: porter's lodge)
(see annex 1).

A test and loading valve having a nominal diameter of 15 mm
must be inserted on the bottom of the flow alarm to verify the
alarm system.

In the pump local, if prepared exclusively to the hydrants
feeding of level 1 and 2, the sprinkler automatic protection
can be omitted (UNI 10779:2007).

Alarms transmission

(Annex I)

Functions to control

The alarms must be connected to an alarm panel in the
sprinkler control place or in the pumps local and must be
showed at distance in accordance with the importance. The
alarms must be transmitted to a place constantly supervised
inside or outside the building, or to a responsible person so
that it is possible to undertake an adequate action.

Alarm levels

As yet told the signals must be carried at distance in
accordance with the importance and precisely as detailed in
the Annex I (normative):

The signals that could be a fire detectors must be represented
as fire alarm (example the water flow indication) (alarm level
A in the table I.1 - EN 12845).

The technical damages that could prevent the plant correct
functioning in case of fire must be showed as damage alarms
(example the electric feeding lacking) (alarm level B in the
table I.1 - EN 12845).



CAPACITIES/PRESSURES TABLES IN THE PRE CALCULATED PLANTS

Table 6 (EN 12845) - Capacity and pressure requirements for the LH and OH pre calculated systems

| Risk class | Capacity l/m | Pressure to the bar control station | Requested maximum capacity l/m | Bar control station pressure |
|---|--------------|-------------------------------------|--------------------------------|------------------------------|
| LH (on humid or pre action) | 225 | 2,2+ps | - | - |
| OH1 on humid or pre action | 375 | 1,0+ps | 540 | 0,7+ps |
| OH1 on dry or alternative OH2 on humid or pre action | 725 | 1,4+ps | 1000 | 1,0+ps |
| OH2 on dry or alternative OH3 on humid or pre action | 1100 | 1,7+ps | 1350 | 1,4+ps |
| OH3 on dry or alternative OH4 on humid or pre action | 1800 | 2,0+ps | 2100 | 1,5+ps |

N.B. - ps in bar is the static pressure due to the highest sprinkler supplier dislivello in the considered net respect to the manometer "C" of the control station.

Table 7 (EN 12845) - Capacity and pressure requirements for the pre calculated systems, designed using the tables from 32 to 35 (Standard UNI EN 12845)

| Discharge density mm/min | Requested Maximum Capacity l/m | | Pressure in the highest reference point (pd) | | | |
|---|--------------------------------|-----------------------|--|------|------|------|
| | On humid or pre action | On dry or alternative | Operative area for sprinkler | | | |
| | | | 6 | 7 | 8 | 9 |
| (1) with pipes diameters in conformance with the table 32-33 and sprinkler with factor K=80 | | | | | | |
| 7.5 | 2300 | 2900 | - | - | 1.80 | 2.25 |
| 10.0 | 3050 | 3800 | 1.80 | 2.40 | 3.15 | 3.90 |
| (2) with pipes diameters in conformance with the table 32-34 and sprinkler with factor K=80 | | | | | | |
| 7.5 | 2300 | 2900 | - | - | 1.35 | 1.75 |
| 10.0 | 3050 | 3800 | 1.30 | 1.80 | 2.35 | 3.00 |
| (3) with pipes diameters in conformance with the table 35-34 and sprinkler with factor K=80 | | | | | | |
| 7.5 | 2300 | 2900 | - | - | 0.70 | 0.90 |
| 10.0 | 3050 | 3800 | 0.70 | 0.95 | 1.25 | 1.60 |
| (4) with pipes diameters in conformance with the table 35-34 and sprinkler with factor K=115 | | | | | | |
| 10.0 | 3050 | 3800 | - | - | - | 0.95 |
| 12.5 | 3800 | 4800 | - | 0.90 | 1.15 | 1.45 |
| 15.0 | 4550 | 5700 | 0.95 | 1.25 | 1.65 | 2.10 |
| 17.5 | 4850 | 6000 | 1.25 | 1.70 | 2.25 | 2.80 |
| 20.0 | 6400 | 8000 | 1.65 | 2.25 | 2.95 | 3.70 |
| 22.5 | 7200 | 9000 | 2.05 | 2.85 | 3.70 | 4.70 |
| 25.0 | 8000 | 10000 | 2.55 | 3.50 | 4.55 | 5.75 |
| 30.0 | 9650 | 12000 | 3.60 | 4.95 | 6.50 | - |

N.B. - if in the net there are sprinklers that are higher of the reference point, to the pd value the static pressure is added to the highest sprinklers reference points.

Table 14 (EN 12845) - Pump pressure and capacity

| Plant | Risk class all | Pump nominal capacity | Pump suction condition |
|-----------------------|----------------|--|---|
| Pre calculated | LH - OH | Requested maximum capacity obtained from the table 6 | For tanks with hydraulic feeding to the water minimum level (see X in Figure 4) For the over pressure pumps with the water system minimum pressure |
| | HH | 1.4 x requested maximum capacity obtained from the table 7 | |
| Calculated integrally | Tutte | Requested maximum capacity | |

Table 16 (EN 12845) - Pump minimum characteristics for LH and OH (pre calculated systems)

| Risk class | Sprinkler height over the control station m | Nominal data | | Characteristics | | | |
|---|---|--------------|--------------|-----------------|--------------|--------------|--------------|
| | | Pressure bar | Capacity l/m | Pressure bar | Capacity l/m | Pressure bar | Capacity l/m |
| LH (on humid or pre action) | $h \leq 15$ | 1.5 | 300 | 3.7 | 225 | - | - |
| | $15 < h \leq 30$ | 1.8 | 340 | 5.2 | 225 | - | - |
| | $30 < h \leq 45$ | 2.3 | 375 | 6.7 | 225 | - | - |
| OH1 on humid or pre action | $h \leq 15$ | 1.2 | 900 | 2.2 | 540 | 2.5 | 375 |
| | $15 < h \leq 30$ | 1.9 | 1150 | 3.7 | 540 | 4.0 | 375 |
| | $30 < h \leq 45$ | 2.7 | 1360 | 5.2 | 540 | 5.5 | 375 |
| OH1 on dry or alternative OH2 on humid or pre action | $h \leq 15$ | 1.4 | 1750 | 2.5 | 1000 | 2.9 | 725 |
| | $15 < h \leq 30$ | 2.0 | 2050 | 4.0 | 1000 | 4.4 | 725 |
| | $30 < h \leq 45$ | 2.6 | 2350 | 5.5 | 1000 | 5.9 | 725 |
| OH2 on dry or alternative OH3 on humid or pre action | $h \leq 15$ | 1.4 | 2250 | 2.9 | 1350 | 3.2 | 1100 |
| | $15 < h \leq 30$ | 2.0 | 2700 | 4.4 | 1350 | 4.7 | 1100 |
| | $30 < h \leq 45$ | 2.5 | 3100 | 5.9 | 1350 | 6.2 | 1100 |
| OH3 on dry or alternative OH4 on humid or pre action | $h \leq 15$ | 1.9 | 2650 | 6.0 | 2100 | 3.5 | 1800 |
| | $15 < h \leq 30$ | 2.4 | 3050 | 4.5 | 2100 | 5.0 | 1800 |
| | $30 < h \leq 45$ | 3.0 | 3350 | 6.0 | 2100 | 6.5 | 1800 |

N.B. -1- the listed pressures are those ones measured to the control station.

N.B. -2- for buildings that exceed the showed heights, it would be demonstrated that the pump characteristics are suitable to supply the capacities and the pressure listed in the paragraph 7.3.1.

HYDRAULIC FEEDING TYPE CHOICE

Single hydraulic feedings

The following single hydraulic feedings are admitted:

- a) a water system
- b) a water system with one or more over pressure pumps
- c) a pressure tank (only for LH and OH1)
- d) a gravity tank
- e) an accumulation tanks with one or more pumps
- f) an inexhaustible source with one or more pumps

Superior single hydraulic feedings

The superior single hydraulic feedings are single hydraulic feedings that supply a high reliability degree.

They include the followings:

- a) water system feeds from both the extremities, respecting the following conditions:
 - every extremity must satisfy the pressure and system capacity request
 - must be fed from two or more water sources
 - must be independent in any point on the single, main pipe
 - the over pressure pumps, if necessary, must be two or more
- b) a gravity tank without over pressure pump or an accumulation tank with two or more pumps where the tank respects the following conditions:
 - the tank must be of the requested total capacity
 - it must not allow the light or external material penetration
 - drinking water must be used
 - the tank must be painted or protected against the corrosion, so to reduce the necessity to unload the tank for the maintenance operations for a time period not minor of 10 years
- c) an inexhaustible source with two or more pumps.

Double hydraulic feedings

The double hydraulic feedings consist in two single feedings where every feeding is independent from the other one.

Every single feeding that constitutes the double feeding must respect the pressure and capacity characteristics showed in the point 9.7.

Any single feedings combination (included the superior single feedings) can be used with the following limits:

- a) for the OH plants must not be used more a pressure tank
- b) an accumulation tank with reduced capacity can be used (see EN 12845 point 9.3.4)

Combined hydraulic feedings

The combined hydraulic feedings must be superior or double single hydraulic ones designed to feed more anti fire fixed plants, as for example in the case of combined installations of hydrants, fire hoses and sprinkler.

NW: some nations don't accept that the sprinkler plants are fed with combined feeding.

The combined feedings must satisfy the following conditions:

- a) the systems must be calculated integrally
- b) the feeding must be able to supply the summarization of the maximum capacities calculated simultaneously, requested from each system. The capacities must be adequate up to the plant pressure that requests it much more
- c) the feeding duration must not be inferior to what requested for the plant that requests it much more
- d) between the hydraulic feeding and the systems the double connection pipes must be installed.

Hydraulic feeding exclusion (punto 9.7 - EN 12845)

The connections between the hydraulic reserves and the sprinkler control stations must be performed so to guarantee that:

- a) the main components maintenance is facilitated (filters, pumps, not return valves and contactors for water)
- b) any problem to a feeding doesn't damage the functioning of any other source or feeding
- c) the maintenance can be performed on a feeding without obstacle the functioning of no other source or feeding.

FIRE FIGHTING SYSTEM AND ACCESSORIES CHOICE

The fire fighting systems in accordance with UNI EN 12845: Functioning principles

The anti fire groups in accordance with UNI EN 12845 are composed from one or more service pumps activated from electric motors or diesel, the installation of a compensation pump (jockey pump) is besides suggested to compensate modest water falls in the plant, avoiding useless feeding pumps startings (UNI EN 12845 point 3.39).

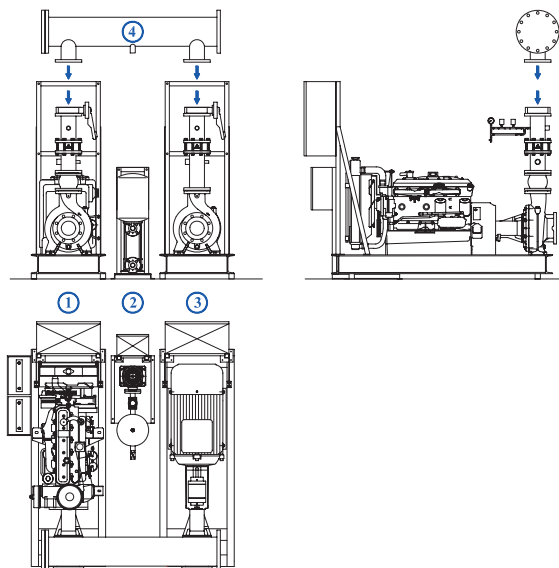
If inside the anti fire hydraulic net there is pressure shrinkage due to little structural losses, the compensation pump start to carry again in pressure the plant and after it stops automatically. If instead the pressure loss is due to a consistent hydraulic withdraw (example sprinkler opening), the pilot pump capacity isn't more sufficient to compensate, so the pressure inside the anti fire hydraulic net goes down up to the intervention threshold calibrated in the starting manostats of the service first pump (electric pump or motor pump); in the case the service first pump doesn't start (for feeding voltage lacking or damage), the pressure in the pipe goes down further up to the intervention threshold calibrated in the starting manostats of the service second pump (electric pump or motor pump). The service pumps remain in "motion" as long as aren't stopped manually directly on the respective control electric panel (unique admitted variance and valid only for hydrant nets, in places not constantly supervised: timed stop after 20 minutes UNI 10779:2007).

FOURGROUP propones the fire fighting systems in accordance with UNI EN 12845 in single separated modules, with the aim to compose them as from the plant needs:

- service electric pump module on base in painted steel section, completed of lock in accordance with UNI EN 12845 and of control electric panel in metallic box installed on skid board (up to power of kW 90, for powers superior the panel is supplied loose in metallic rack).
- service motor pump module on base in painted steel sections completed of lock in accordance with UNI EN 12845 and with the control electric panel in metallic box installed on skid board. The module is supplied with diesel tank on pedestal performed in accordance with EN 12845.
- compensation pump module (jockey pump) on base in painted steel sections completed of membrane autoclave tank lt 20 bar 16 and control electronic panel in airtight thermo plastic box installed on skid board.

In this way the Customer can manufacture the anti fire group in accordance with UNI EN 12845 simply summarizing the desired modules:

example: to obtain a group composed from main electric pump + reserve motor pump + compensation pump, 1 main electric pump module (3) + 1 main motor pump module (1) + 1 compensation pump module (2) + 1 unique collector of lock (4) must be ordered; if you want an unique base in painted steel sections on which all is assembled, it should be necessary to acquire the adequate base.



FIRE FIGHTING SYSTEM IN ACCORDANCE WITH UNI EN 12845

| | |
|---|----------------------------------|
| ① | Main motor pump |
| ② | Kit for pilot pump |
| ③ | Main electric pump |
| ④ | Lock unique collector (optional) |

The group “manufactured by You” will be supplied with separated modules or on request assembled on a unique base in painted steel sections. In every case it will be possible to choose separate the “obligatory components” requested from the standard UNI EN 12845, that we list here follow:

- lock unique collector in zinc coated steel, bi flanged PN16,
- eccentric suction (minimum DN80 and dimensioned for flow speed equal to m/s 1.5 if the group is over heading installed, or minimum DN65 and dimensioned for m/s 1.8 if the group is under heading installed),
- interception valves in suction, with position gauge (with reducer and wheel if >DN100); don't place directly on the pump suction mouth,
- Y filters to install in suction
- bottom valves completed of rose pipe
- pump priming tanks in accordance with EN 12845, for over heading installation,
- capacity gauge with resending reading measure screen for interposition between flanges,
- auto fed luminous acoustic alarm/s for alarms signal,
- possible contacts for the valves condition signal (open/close).

The electric panels installed on the fire fighting systems described in the present manual respect the following characteristics in accordance with UNI EN 12845:

Control electric panel for main electric pump

- Electric mechanical panel (direct starting if power <Hp 15, star-triangle for power Hp 15);
- Input net 3 ~ 50/60Hz 400V $\pm 10\%$;
- Transformer 400 V/24 V for auxiliary circuits;
- Input in lowest voltage for control from n°2 manostats in call/run series (contact NC with plant in pressure and electric pump stopped);
- Input in lowest voltage for electric pump control from priming tank float (contact NA with tank full of water);
- Input in lowest voltage for signal from electric pump manostat in pressure/motion (contact NA with plant in pressure and electric pump stopped);
- AUTO-0-EMERGENCY key selector: in AUTOMATIC position the electric pump starting through electronic switchboard; in EMERGENCY position the instantaneous electric pump starting;
- Electric pump management electronic switchboard:
- RUN/STOP buttons of the electric pump for manual test;
- Test button for switchboard indicating light;
- Switchboard functions sliding button;
- Back lighted LCD display to visualize n°3 net voltmeters, frequency meter, watt meter, varmeter, voltammeter, power factor meter, total counter, partial counter, event historic;
- Motor green indicating light in function (checked from ammeter survey);
- Electric pump green indicating light in function (with started motor it is surveyed from the absorbed power and/or from the pump manostat control in motion);
- Net presence green indicating light;
- Green indicating light of pump starting request from call manostats;
- Green indicating light of pump starting request from the priming tank float;
- Green indicating light of started electric pump from “RUN” button;
- Yellow indicating light of lacked pump starting;
- Yellow indicating light of cumulative anomaly;
- Red indicating light of starting request from the call manostats;
- Red indicating light of excluded automatic starting;
- Red indicating light of stopped electric pump from stop button;
- Functioning system in accordance with UNI10779 with delay timer to the electric pump switching off settable from 1 to 30’;
- Possibility to set the visualizations on display in 5 languages: Italian, English, Spanish, German, French;
- Specific delay and alarms functions settable from switchboard (make reference to the manual annexed to the panel);
- Electric pump control contactor dimensioned in AC4;
- Auxiliary protection fuses;
- Breaking high capacity fuses of motor protection;
- General disconnector with door block;
- Alarm exit with contact in exchange (max 5° 250V AC1) for the signal of “ELECTRIC FEEDING AVAILABILITY”;
- Alarm exit with contact in exchange (max 5° 250V AC1) for the signal of “PUMP STARTING REQUEST”;
- Alarm exit with contact in exchange (max 5° 250V AC1) for the signal of “PUMP IN FUNCTION”;
- Alarm exit with contact in exchange (max 5° 250V AC1) for the signal of “LACKED STARTING”;
- Metallic cover;
- Exit with anti tear cables press;
- Protection degree IP55;
- Environment temperature: -5/+40°C;
- Relative humidity 50% to 40°C (not condensed);

Control electric panel for main motor pump

- Electric mechanical panel for Motor pump starting;
- Net input 1 ~ 50/60Hz 230V $\pm 10\%$;
- Input from n°02 external lead accumulators for starter control and auxiliary circuits feeding;
- Input in lowest voltage for control from n°2 manostats in call/run series (contact NC with plant in pressure and Motor pump stopped);
- Input in lowest voltage for Motor pump control from priming tank float (contact NA with tank full of water);
- Input in lowest voltage for signal from Motor pump manostat in pressure/motion (contact NA with Motor pump stopped);
- Motor pump management electronic switchboard;
- Motor pump manual starting buttons;
- Motor pump manual stop button;
- Anomalies restoring button;
- Manual starting test button (active in case of lacked automatic starting);
- Switchboard indicating lights test button;
- Switchboard functions sliding button;
- Manual Emergency starting buttons protected from "Safe crash";
- Back lighted LCD Display for visualization of n. 2 batteries voltmeters, Display LCD back lighted for visualization of n° 2 batteries voltmeter, n° 2 batteries ammeters, revolution counters, total counter, partial counter, fuel level gauge, water thermometer, oil thermometer, oil manometer, counter starting from batteries and event historic.
- Green indicating light of motor pump in function;
- Green indicating light of pump starting request from the priming tank float;
- Yellow indicating light of manual starting test button qualification;
- Yellow indicating light of motor pump lacked starting;
- Yellow indicating light of fuel reserve alarm;
- Yellow indicating light of water/oil heater anomaly;
- Yellow indicating light of alarm for insufficient oil pressure;
- Yellow indicating light of alarm for over temperature;
- Yellow indicating light of belt break alarm;
- Yellow indicating lights of alarms for inefficient batteries;
- Yellow indicating lights of anomaly surveyed from the battery charge;
- Green indicating lights of battery charge in function;
- Yellow indicating light of cumulative anomaly;
- Red indicating light of starting request from the call manostats;
- Red indicating light of excluded automatic starting;
- Yellow indicating light of pumping in progress;
- Functioning system in accordance with UNI10779 with delay timer to the electric pump switching off settable from 1 to 30';
- Possibility to set the visualizations on display in 5 languages: Italian, English, Spanish, German, French;
- Specific delay and alarms functions settable from switchboard (make reference to the manual annexed to the panel);
- N°02 battery charge 12Vdc 3A (24Vdc 3A for version to 24V) for the accumulators maintenance;
- Auxiliary protection fuses;

- General dissector with door block;
- Alarm exit with contact in exchange (max 5A 250V AC1) for the signal of "EXCLUDED AUTOMATIC MODALITY";
- Alarm exit with contact in exchange (max 5A 250V AC1) for the signal of "CONTROL PANEL DAMAGE";
- Alarm exit with contact in exchange (max 5A 250V AC1) for the signal of "MOTOR PUMP IN FUNCTION";
- Alarm exit with contact in exchange (max 5A 250V AC1) for the signal of "LACKED STARTING";
- Metallic cover;
- Exit with anti tear cables press;
- Protection degree IP55;
- Environment temperature: -5/+40 °C;
- Relative humidity 50% a 40 °C (not condensed);

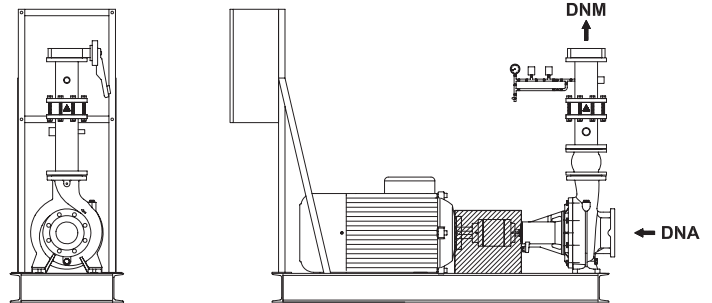
Electric panel of compensation electric pump control

- Electronic panel;
- Net input 3 ~ 50/60Hz 400V $\pm 10\%$
- Input in lowest voltage for control from manostat or float switch;
- Input in lowest voltage for external control from 3 minimum feelers;
- Feelers suitable for not inflammable conductive liquids;
- Selector for the feelers functioning in Filling/emptying;
- Internal regulator for feeler sensibility;
- Motor functioning buttons in Automatic-Switched off-Manual (temporary manual);
- Green indicating light of net presence;
- Green indicating light led of motor in function;
- Red indicating light led of water level alarm;
- Red indicating light led of motor alarm in protection for overcharging;
- Electronic protection for settable motor overcharging;
- Protection intervention time of 5";
- Auxiliaries protection fuses;
- Motor protection fuses;
- Alarm exit with contacts in exchange 5° 250V (resistive loading);
- General disconnecting switch with door block;
- Case in ABS;
- Exit with anti tear wires press;
- Protection degree IP55.
- Environment temperature: -5/+40 °C;
- Relative humidity 50% to 40 °C (not condensed).

HORIZONTAL AXLE MAIN ELECTRIC PUMPS

In accordance with UNI EN 12845

Set ENE10



Main electric pump module in accordance with UNI EN 12845

Main electric pump module:

Spin-dry electric pumps in accordance with EN 733 (ex DIN 24255) axial suction and radial lock, pump body and turning in cast iron, mechanical capacity - coupling performed through spacer elastic joint with three phase asynchronous electric motor. On request the pumps with turning in bronze or in stainless steel and shaft in stainless steel are available. The coupling is performed on the base in sections of painted steel, the pump results completed of lockinstalled on module board.

The ENE10 electric pump module supplying includes in suction the interception valve and the eccentric widening cone that must be ordered separately in accordance with the requested flow maximum speeds in suction in accordance with the standard UNI EN 12845



Control electric panel



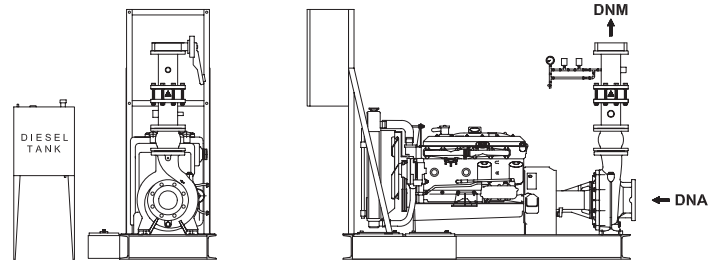
Pump detail



Starting double circuit

HORIZONTAL AXLE MAIN MOTOR PUMPS In accordance with UNI EN 12845

Set ENM10



Main motor pump module in accordance with UNI EN 12845

Main motor pump module:

Spin-dry electric pumps in accordance with EN 733 (ex DIN 24255) axial suction and radial lock, pump body and turning in cast iron, mechanical capacity - coupling performed through spacer elastic joint with diesel motor. On request the pumps with turning in bronze or in stainless steel and shaft in stainless steel are available. The coupling is performed on the base in sections of painted steel, the pump results completed of lock in accordance with UNI EN 12845 and is yet electrically wired

to the control electric panel in accordance with EN 12845 installed on module board. The ENE10 electric pump module supplying doesn't include in suction the interception valve and the eccentric widening cone that must be ordered separately in accordance with the requested flow maximum speeds in suction in accordance with the standard UNI EN 12845.



Control electric panel



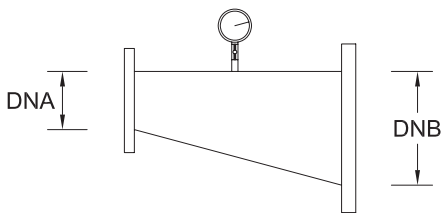
Pump detail



Starting double circuit

OBLIGATORY COMPONENTS FOR FIRE FIGHTING SYSTEMS

Eccentric reductions



Flanged eccentric reductions to install in suction of the main pumps are completed of separation from 1/4 with interception sphere valve and vacuum gauge

| Code | Pump type | Installation type | Reduction model | DNA | DNB |
|---------|-----------|-------------------|-----------------|-------|-------|
| 600.089 | F32... | Under heading | RE50-65 | DN50 | DN65 |
| 600.090 | | Over heading | RE50-80 | DN50 | DN80 |
| 600.091 | F40... | Under heading | RE65-80 | DN65 | DN80 |
| 600.092 | | Over heading | RE65-100 | DN65 | DN100 |
| 600.093 | F50... | Under heading | RE65-125 | DN65 | DN125 |
| 600.094 | | Over heading | RE65-150 | DN65 | DN150 |
| 600.095 | F65... | Under heading | RE80-150 | DN80 | DN150 |
| 600.096 | | Over heading | RE80-200 | DN80 | DN200 |
| 600.097 | F80... | Under heading | RE100-200 | DN100 | DN200 |
| 600.098 | | Over heading | RE100-250 | DN100 | DN250 |
| 600.099 | F100... | Under heading | RE125-250 | DN125 | DN250 |
| 600.100 | | Over heading | RE125-300 | DN125 | DN300 |
| 600.101 | F125... | Under heading | RE150-300 | DN150 | DN300 |
| 600.102 | | Over heading | RE150-350 | DN150 | DN350 |

Butterfly interception valves type LUG



Butterfly interception valves, type LUG, with threaded ears, completed of manoeuvre lever up to DN100 and of wheel for superior diameters. On request it is possible to order the stroke end contacts for the valve ON/OFF condition monitoring: supports for lever with two contacts of stroke end for valves with manoeuvre lever of diameter up to DN100, manual reducer with two stroke end contacts for valves having diameter superior to DN100.

| Code | Stroke end contacts | DN valve |
|---------|---------------------|-----------|
| 600.113 | FC50-80 | DN50-DN80 |
| 600.114 | FC-100 | DN100 |
| 600.115 | FC-RM | > DN100 |

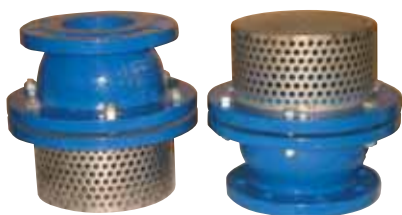
| Code | Model | DN |
|---------|---------|-------|
| 600.103 | LUG-50 | DN50 |
| 600.104 | LUG-65 | DN65 |
| 600.105 | LUG-80 | DN80 |
| 600.106 | LUG-100 | DN100 |
| 600.107 | LUG-125 | DN125 |
| 600.108 | LUG-150 | DN150 |
| 600.109 | LUG-200 | DN200 |
| 600.110 | LUG-250 | DN250 |
| 600.111 | LUG-300 | DN300 |
| 600.112 | LUG-350 | DN350 |

Anti vibrating elastic compensators



| Code | Model | DN |
|---------|--------|-------|
| 600.415 | CE-50 | DN50 |
| 600.416 | CE-65 | DN65 |
| 600.417 | CE-80 | DN80 |
| 600.418 | CE-100 | DN100 |
| 600.419 | CE-125 | DN125 |
| 600.420 | CE-150 | DN150 |
| 600.421 | CE-200 | DN200 |
| 600.422 | CE-250 | DN250 |
| 600.423 | CE-300 | DN300 |
| 600.424 | CE-350 | DN350 |

Bottom valves completed of rose pipe



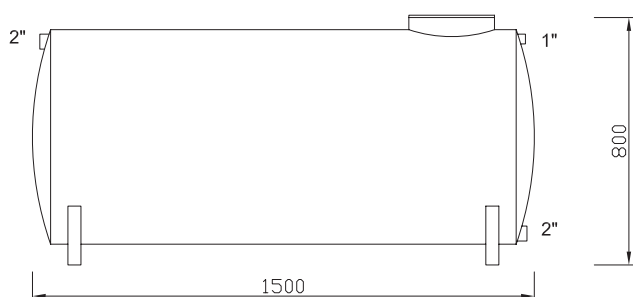
The following operations are always necessary if:

- the anti fire group installation is overhead
- when the installation is under head but the pump axle places over the water minimum level (see point 9.3.5. - EN 1284).

| Code | Model | DN |
|---------|--------|-------|
| 600.116 | VF-50 | 2" |
| 600.117 | VF-65 | DN65 |
| 600.118 | VF-80 | DN80 |
| 600.119 | VF-100 | DN100 |
| 600.120 | VF-125 | DN125 |
| 600.121 | VF-150 | DN150 |
| 600.122 | VF-200 | DN200 |
| 600.123 | VF-250 | DN250 |
| 600.124 | VF-300 | DN300 |

Execution priming tanks EN 12845

(obligatory only for overhead installation - a tank for every pump)

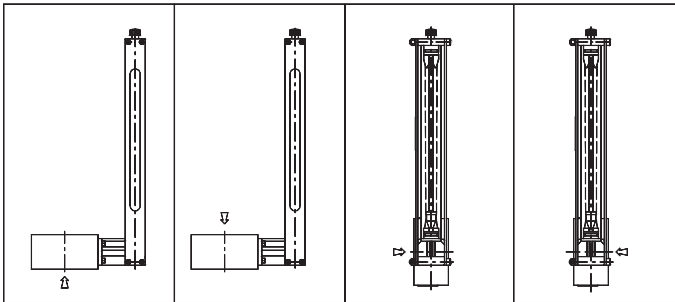


Priming basin in zinced steel from 500 litres completed of:

- level meter for signal of minimum level
- float valve for basin feeding 1"
- output for pump priming 2", recirculation input, interception and unloading valves, accessories.

| Code | Model | Joints |
|---------|---------|--------------------------------------|
| 600.126 | VAD-500 | Load 1" Too full 2" Priming 2" |

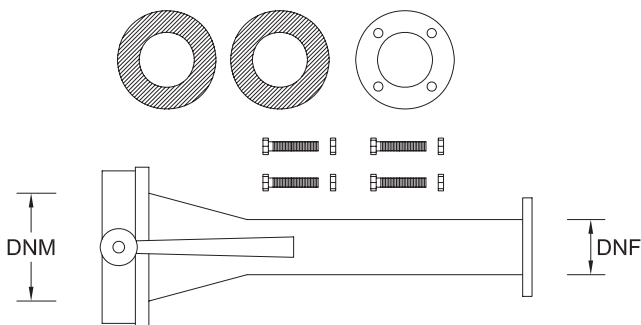
Blood flow meter in derivation with postponed reading suitable for the interposition between flanges



Assembly possibility

| Code | Model | DN | Full scale |
|---------|-------|-------|------------------------|
| 600.127 | T40 | DN40 | m ³ /h 40 |
| 600.128 | T50 | DN50 | m ³ /h 65 |
| 600.129 | T65 | DN65 | m ³ /h 100 |
| 600.130 | T80 | DN80 | m ³ /h 150 |
| 600.131 | T100 | DN100 | m ³ /h 280 |
| 600.132 | T125 | DN125 | m ³ /h 420 |
| 600.133 | T150 | DN150 | m ³ /h 600 |
| 600.134 | T200 | DN200 | m ³ /h 800 |
| 600.135 | T250 | DN250 | m ³ /h 1000 |
| 600.136 | T300 | DN300 | m ³ /h 1000 |

Blood flow meter union kit



Biflanged reduced trunk in zinc steel, for the union of the possible lock collector with the capacity gauge (blood flow meter). Besides the trunk are supplied loose: butterfly interception valve of the superior diameter for the blood flow meter exclusion, counter flange to weld, nr. 2 black rubber gaskets and bolts for the gauge fastening of capacity in accordance with the counter flange in endowment.

| Code | Pump type | Kit model | DNM | DNF |
|---------|-----------|-----------|-------|-------|
| 600.137 | F32... | KF65-40 | DN65 | DN40 |
| 600.138 | F40... | KF65-50 | DN65 | DN50 |
| 600.139 | F50... | KF80-65 | DN80 | DN65 |
| 600.140 | F65... | KF100-80 | DN100 | DN80 |
| 600.141 | F80... | KF125-100 | DN125 | DN100 |
| 600.142 | F100... | KF150-125 | DN150 | DN125 |
| 600.143 | F125... | KF200-150 | DN200 | DN150 |

Auto fed lightly acoustic alarm model AC/LU13

mod. AC/LU13

(nr. 1 alarm input "level A" and nr. 3 alarm inputs "level B")

This equipment allows the alarm control and remote signal of an Electric pump/Motor pump in accordance with the standards EN12845.

Alarm signal electronic panel; net input 1 ~ 50/60Hz 230V ±10%; Transformer 400 V/24 V for auxiliary circuits, n.1 input in lowest voltage from clean contact NC for anti fire alarm "level A" (to the NC contact opening the red indicating light and the buzzer are activated); n.3 inputs in lowest voltage from NC clean contact for damage alarm "level B" (to the NC contact opening the yellow indicating light and the buzzer are activated); green indicating light of voltage presence; Red indicating light of "alarm"; red indicating light excluded "siren"; Button "test" for siren temporary activation; Button "reset" for the alarm condition manual restoration; Button "siren activation" for the sound buzzer activation; Button "siren exclusion" to exclude the sound buzzer; Internal selector to select alarm restoration way (automatic - manual); internal selector for siren automatic switching off timer activation; trimmer to select automatic switching off delay time (from 25" to 120"); sound alarm buzzer 90dB 12Vcc; Internal sealed battery for auto feeding 12Vcc 1,2Ah; auxiliary protection fuse; Accumulator protection fuse; General alarm output with contact in exchange (max 5° 250V AC1); yellow indicating light alarm lamp 3W 12Vcc; red indicating light alarm lamp 3W 12Vcc; case in thermal plastic material; Output with anti tear wires press; Protection degree IP55;

mod. AC/LU412

(nr. 4 alarm input "level A" and nr. 12 alarm inputs "level B")

Alarms signal electronic panel with characteristics as above-mentioned, but with nr. 4 inputs in lowest voltage from NC clean contact for fire alarm "level A" (to the NC contact opening the red indicating light and the buzzer are activated); n.12 inputs in lowest voltage from NC clean contact for damage alarm "level B" (to the NC contact opening the yellow indicating light and the buzzer are activated);



| Code | Model |
|---------|----------|
| 600.144 | AC/LU13 |
| 600.145 | AC/LU412 |

Technical vain sprinkler protection (excluded the hydrant nets)



On the each main pump lock a threaded break from 1 ½". is present that is the derivation dedicated to the technical vain sprinkler protection; the kit will be completed with an interception valve 1 ½". and alarm blood flow meter to supply at distance a visual and acoustic indication of the sprinkler functioning, test valve and system discharging from ½".

| Code | Model |
|---------|---------|
| 600.146 | KIT-SPK |

Recirculation flow gauge

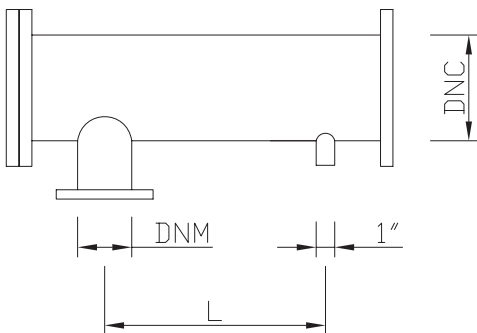


Every main pump is equipped with a device to assure a water continue flow through the pump sufficient to prevent the over heating when it functions with closed lock. The circuits discharge must be clearly visible and where there are more pumps the circuits discharges must be separated.

The proposed flow gauge has a gas female joint from 1/2".

| Code | Model |
|---------|-------|
| 600.147 | IN-FL |

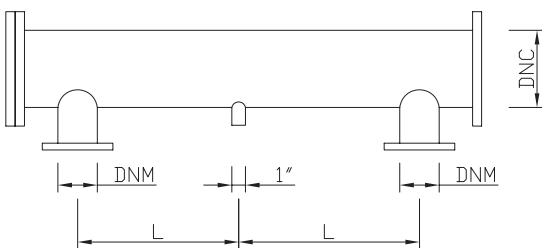
Lock unique collectors



Lock collectors suitable for ONE main pump and ONE pilot pump

The anti fire modules are supplied without lock unique collector, if they serve have to be ordered separately. The chosen collector will be supplied completed of blind counter flange, bolts and fastening dices, black rubber gasket. Follow the collector choice table:

| Code | Pump type | Collector model | DNC | DNM | L |
|---------|-----------|-----------------|-------|-------|--------|
| 600.148 | F32... | CM65-50-11 | DN65 | DN50 | mm 500 |
| 600.149 | F40... | CM65-50-11 | DN65 | DN50 | mm 500 |
| 600.150 | F50... | CM80-65-11 | DN80 | DN65 | mm 500 |
| 600.151 | F65... | CM100-80-11 | DN100 | DN80 | mm 600 |
| 600.152 | F80... | CM125-100-11 | DN125 | DN100 | mm 600 |
| 600.153 | F100... | CM150-125-11 | DN150 | DN125 | mm 600 |
| 600.154 | F125... | CM200-150-11 | DN200 | DN150 | mm 600 |



Lock collectors suitable for TWO main pumps and ONE pilot pump

| Code | Pump type | Collector model | DNC | DNM | L |
|---------|-----------|-----------------|-------|-------|--------|
| 600.155 | F32... | CM65-50-21 | DN65 | DN50 | mm 500 |
| 600.156 | F40... | CM65-50-21 | DN65 | DN50 | mm 500 |
| 600.157 | F50... | CM80-65-21 | DN80 | DN65 | mm 500 |
| 600.158 | F65... | CM100-80-21 | DN100 | DN80 | mm 600 |
| 600.159 | F80... | CM125-100-21 | DN125 | DN100 | mm 600 |
| 600.160 | F100... | CM150-125-21 | DN150 | DN125 | mm 600 |
| 600.161 | F125... | CM200-150-21 | DN200 | DN150 | mm 600 |