the evolution of the species

from HC46

to Xfarm

the evolution of the species
The main feature of the **farm** is the color display screen (4.3”) with WQVGA 480x272 dots resolution with led backlighting. The user interface is easy and friendly. The *easy touch* screen systems gives both the typical “easy to use” approach of a touch screen system and the strength and mechanical protection of a polycarbonate IP65 keyboard.

At every screen the function keys display a different graphic making the program very user friendly. Each programming step has its own help screen so the program has a “built in” instruction manual.
**Data transfer**

Communication with external world is by USB pen drive. The main programming parameters, the archive downloads and software updates can be made by PC connection via the USB pen drive.

**Network connection**

Communication is possible with HLAN, TR04 Radio-modem 485. Range is 500mt.

Communication is also possible with TR04. Range is 500mt.

Communication is also possible with Internet.
Climate configuration
By setting a few parameters in "Climate configuration" you can choose between several types of typical climate control systems.

16 inputs - 24 on-off outputs and 3 0-10V outputs can be assigned to climate control:
- 10 x On-Off ventilation Steps with Winter-Summer ventilation mode
- 0-10V ventilation by inverter
- 2 x flaps (air inlets) working either by static pressure or Associative or Proportional or Natural mode
- 3 Heaters
- 1 Cooling.

farm displays the climate control configuration according to what programmed in the "Climate Configuration" section.
Xfarm can manage ventilation control

Up to 10 x independent and fully configurable ventilation steps according to following typical options:
- On / Off
- Fan speed control by transformer
- Proportional by 0 -10 V for triac / inverter speed control
- Or a combinations of the three systems above.

Xfarm can manage air flaps control

Flaps
- Up to 2 independent flaps (air inlets) working either by static pressure by Depressiometer or Associative or Proportional or Natural mode (by 0-10V or by feedback potentiometer).
**Heating**

3 ON-OFF or 0-10V heaters with independent temperature probe.

**Cooling and Humidification Control**

**Cooling**

Controls of cooling system by temperature and % RH.

**Humidification**

Humidification according to temperature and % RH.
**farm** can manage **environmental control**

**Average temperature value**
Up to 2 probes can be connected to measure the indoor ventilation temperature. These probes, along with the heating and the flaps probes can be connected to create an “average” temperature value as a mix of the temperatures as recorded by the above probes.

**Humidity probe**
The %RH probe affects Ventilation, Cooling and Humidification systems.

**CO2 - NH3 probe**
CO2 and NH3 probes affect Ventilation systems.

**Calendar**
Heating and ventilation options can be set to run automatically according to the day of the batch.

**farm** store in **archives** all the data of the cycle

**Archive**
In the Archive are recorded:
- daily values of internal and external temperature
- daily working time of heaters
- total working times from cycle start-up.
Alarms
Temperature, humidity, air-pressure, CO2-NH3, recording all the alarm events (including alarm exclusions).

Xfarm archives all alarms triggered during current cycle

HP29/W independent alarm
Independent ventilation alarm unit which is a supplementary source of the following alarm:
- Minimum and maximum temperature.
- Minimum and maximum air-pressure.
- Check of Xfarm correct functions by a signal sent every 6 min (watchdog).
Feed management can be done either by the silos load cells, or by volumetric system (when silos have no load cells) by converting the auger working time into Kg, or by an external weighing system (i.e. a mechanical weigher).

Feed distribution can be done in this mode:

- **Unlimited.** NO limit of weight and time. **Xfarm** manages the feed distribution, and then keeps a record of it into the Archive.
- **Fixed meal.** At a preset time **Xfarm** supplies the programmed quantity of feed, and then keeps a record of it into the Archive.
Feeding configuration
By setting a few parameters in “Feeding configuration” you can choose between several types of typical feeding control systems.

8 inputs - 6 on-off outputs and 1 0-10V outputs can be assigned to climate control:
- 1 Silo with load cells or without load cells (volumetric system)
- 1 Birds weigher
- Water supply
- Lights (either working in on-off mode or by 0-10V regulation).

When activated all Feeding parameters are displayed on main screenshot.
Feed management can be done either by the silos load cells, or by volumetric system (when silos have no load cells) by converting the auger working time into Kg, or by an external weighing system (i.e. a mechanical weigher).

Water management
Water distribution is programmable at preset times and consumption is recorded by the water meter. Water level is kept under constant control to prevent problems.

Lights
Lights can control by On/off output and with dawn/sunset 0-10V output.

Birds weighing
Bird weighing is performed by weigher plate.

farm can manage feeding control

farm can manage Birds weighing control
**Silo weighing**
Detection and recording of feed consumption done by load cells. Automatic detection of silo uploading.

**Archive**
Daily and total cycle data are all stored into the Archive.
Silos weighing: How to control the feed weight. By load cell system or by volumetric?

Load cells System

This system makes a direct measurement of feed contained in the silos by the load cell which are located under each silos leg.

**Advantages:**
- Total quantity of feed in the silos can be displayed weighing measurement is very accurate Alarm “Stock/meals” can be activated.
- An outdoor silo weigh display repeater (HP63/W) can be connect to Xfarm to always keep an eye on Silo Kg content.

**Disadvantages**
- Load cells installation is required.

Volumetric system

This systems allows the feed weight control by counting the working time of the silos auger and converting it in Kg of feed. This requires a calibration procedure (to be run every time the feed density is different from previous supplies):

Xfarm runs the auger by 30 sec then check how many Kg were downloaded and convert the feed/time ration into a “K” factor.

**Advantages:**
- No load cells are required.

**Disadvantages**
- The accuracy of system depends on the accuracy of calibration and K factor.
- The alarm “Stock/meals” (how many meals are contained in the silos) cannot be activated.
The farm can manage birds weighing control.

### Chicken weighing plate

<table>
<thead>
<tr>
<th>PWS1s plate for chicks</th>
<th>Turkeys weighing plate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plate diameter</strong></td>
<td><strong>Plate diameter</strong></td>
</tr>
<tr>
<td>76 cm</td>
<td>98 cm</td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td><strong>Length</strong></td>
</tr>
<tr>
<td>320 cm</td>
<td>380 cm</td>
</tr>
<tr>
<td><strong>Insulation</strong></td>
<td><strong>Insulation</strong></td>
</tr>
<tr>
<td>IP56</td>
<td>IP56</td>
</tr>
</tbody>
</table>

![Chicken weighing plate diagram](image1)

![Turkeys weighing plate diagram](image2)
Examples of some typical configurations on Xfarm

**EXAMPLE 1**

| Relay 10 | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | On | On |
| Relay 9  | Off | Off | Off | Off | Off | Off | Off | Off | Off | On | On | On |
| Relay 8  | Off | Off | Off | Off | Off | Off | Off | Off | On | On | On | On |
| Relay 7  | Off | Off | Off | Off | Off | Off | Off | On | On | On | On | On |
| Relay 6  | Off | Off | Off | Off | Off | Off | On | On | On | On | On | On |
| Relay 5  | Off | Off | Off | Off | On | On | On | On | On | On | On | On |
| Relay 4  | Off | Off | On | On | On | On | On | On | On | On | On | On |
| Relay 3  | Off | On | On | On | On | On | On | On | On | On | On | On |
| Relay 2  | Off | On | On | On | On | On | On | On | On | On | On | On |
| Relay 1  | Exchange | On | On | On | On | On | On | On | On | On | On | On |

**EXAMPLE 2**

| Relay 10 | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | On | On |
| Relay 9  | Off | Off | Off | Off | Off | Off | Off | Off | Off | On | On | On |
| Relay 8  | Off | Off | Off | Off | Off | Off | Off | Off | On | On | On | On |
| Relay 7  | Off | Off | Off | Off | Off | Off | On | On | On | On | On | On |
| Relay 6  | Off | Off | Off | Off | On | On | On | On | On | On | On | On |
| Relay 5  | Off | Off | On | On | On | On | On | On | On | On | On | On |
| Relay 4  | Off | On | On | On | On | On | On | On | On | On | On | On |
| Relay 3  | Off | On | On | On | On | On | On | On | On | On | On | On |
| Relay 2  | Off | On | On | On | On | On | On | On | On | On | On | On |
| Relay 1  | Exchange | On | On | On | On | On | On | On | On | On | On | On |

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Winter ventilation

Summer ventilation
Examples of some typical configurations on Xfarm

**EXAMPLE 3**

![Climate Configuration Diagram]

**EXAMPLE 4**

![Climate Configuration Diagram]
Examples of some typical configurations on

**EXAMPLE 5**

![Climate Configuration Diagram](image1)

**EXAMPLE 6**

![Climate Configuration Diagram](image2)
Examples of some typical configurations on farm

**EXAMPLE 7**

Winter ventilation is done by 5 speed autotransformer (each further step switches the previous step off).

**EXAMPLE 8**

On this farm layout Ventilation is managed by speed regulation by inverter at Step 1 and by on/off ventilation on further steps (Step 2 to Step 10).
Examples of some typical configurations on Xfarm

**EXAMPLE 9**

Winter ventilation
Summer ventilation

0-10V output has a ramp behaviour. It goes from min to max for each step (1-2-3-4-5).

The ventilation system can be managed 2 ways:

**A** > Fan(s) at step 1 are speed regulated by inverter (0-10V). Once 100% of speed regulation is reached for any further increase of temperature the fan at Step 2 is switched on (on-off full speed) and fan(s) at Step 1 are reduced to min speed. For any further increase of temperature fan speed of Step 1 is proportionally increased up to 100%, then also the 3rd step is switched on (being step 2 always on) and so on. By using this procedure you can have a continuous ventilation curve by only using a small and relatively unexpensive inverter to control the 1st step. Hence this 1st step is used to adjust ventilation within each on-off step.

**Advantages**
- You get a continous proportional ventilation curve by using only a small inverter.
- The first ventilation step should be equivalent to other steps as fan air flow capacity.
- Usually first step is made by 2 small fans of half capacity of big fans at other steps.

**Disadvantages**
- Beyond step 1 you can have on-off fans and inverter fans working at same time.

**B** > Fan(s) at Steps one is speed regulated up to 100% capacity. Beyond that temperature at step 2 a new speed regulated fan will be switched on at a preset % of speed and it will work at same speed of fan at step 1 (i.e. if Step 1 and Step 2 have equal max air flow they will be both set at 50% of nominal max speed). When more steps will be activated the speed of all the steps will change: 3 steps = 33% 4 steps = 25% and so on (assuming all steps have same max air flow).

**Advantages**
- All fans will be speed regulated at same speed.

**Disadvantages**
- A bigger inverter is required to control all fans.
Xfarm layout components

HXNE
N.8 Analogs Inputs unit

HDY6
N.6 Relays Output unit

HXDA
N.4 0-10V Outputs unit

HA20
Power-pack for probe

TLC2
Silo load-cells amplifier

TLC0
Weighing plate amplifier

DP59/W
Negative pressure controller

WT1: Psychrometric kit with dry bulb and wet bulb probe

HP29/W
Additional alarm control

HP63/W
Silo weight repeater

SX
Temperature probe

PT
Flap feedback potentiometer

RHR
Humidity probe

CO2E
CO2 probe
### Inputs

**HXNE N.1 Inputs (Climate)**
- 1 = Temperature probe Ventilation 1
- 2 = Temperature probe Heating 1
- 3 = Temperature probe Heating 2
- 4 = DP59/W negative pressure controller
- 5 = Humidity probe (Wet bulb or 4-20mA)
- 6 = Outside temperature probe
- 7 = Flap 1 Potentiometer
- 8 = Flap 2 Potentiometer

**HXNE N.2 Inputs (Climate)**
- 1 = Temperature probe Ventilation 2
- 2 = Temperature probe Heating 3
- 3 = Temperature probe Flap 1
- 4 = Temperature probe Flap 2
- 5 = Free (F.F.U)
- 6 = CO2 probe 4-20mA
- 7 = NH3 probe 4-20mA
- 8 = External alarm input signal

**HXNE N.3 Inputs (Feeding)**
- 1 = Water counter sensor
- 2 = Hopper level sensor
- 3 = Feed counter sensor
- 4 = Free (F.F.U)
- 5 = Free (F.F.U)
- 6 = Free (F.F.U)
- 7 = Free (F.F.U)
- 8 = Upload silo signal

### Outputs

**HDY6 N.1 Outputs (Climate)**
- 1 = Ventilation 1
- 2 = Ventilation 2
- 3 = Ventilation 3
- 4 = Ventilation 4
- 5 = Ventilation 5
- 6 = Ventilation 6

**HDY6 N.2 Outputs (Climate)**
- 1 = Heating 1
- 2 = Heating 2
- 3 = Cooling
- 4 = Flap 1 Close
- 5 = Flap 1 Open
- 6 = Watch-dog (for HP29/W)*1

**HDY6 N.3 Outputs (Climate)**
- 1 = Ventilation 7
- 2 = Ventilation 8
- 3 = Ventilation 9
- 4 = Ventilation 10
- 5 = Flap 2 Close
- 6 = Flap 2 Open

**HDY6 N.4 Outputs (Climate)**
- 1 = Heating 3
- 2 = Humidification
- 3 = Free
- 4 = Free
- 5 = Free
- 6 = Free

**HDY6 N.5 Outputs (Feeding)**
- 1 = Silo auger
- 2 = Feeders
- 3 = Light
- 4 = Water (Normally Open water-valve)
- 5 = Free timer
- 6 = Free (f.f.u.)

#### Weight Cells Input (Feeding)

- N.1 **TLC0** = Birds weighing load cell amplifier
- N.1 **TLC2** = Silos weighing load cells amplifier

#### Silo Weight Repeater (Feeding)

- N.1 **HP63/W** = Silo weight repeater

#### 0-10V Outputs

- 1 = Ventilation
- 2 = Flap 1
- 3 = Flap 2
- 4 = Light