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1. Commissioning

These general comments about commissioning the controller apply to both the **Touch Screen Display** option and the **Keypad Text Display** option.



WARNINGS

- While the control is operating in Commission mode, certain safety checks cannot be performed. Therefore, the safety of the system operation is the sole responsibility of the person carrying out the commissioning process.
- Do not allow fuel to accumulate in the combustion chamber.
If fuel is allowed to enter the chamber for more than a few seconds without igniting, an explosive mixture could result.
- If a flame failure occurs at any point, the control will not attempt a re-start until the fault is cleared. Before moving to the ignition position to attempt a re-start the system will perform a combustion chamber pre-purge.
- Where operating times are adjustable, make sure that those selected are acceptable for the appliance being controlled.
- Make sure that a purge position is entered for each drive as required. Failure to enter a purge position will mean all drives remain at their 'closed' positions.
- After selecting all safety times, it is the responsibility of the person commissioning the burner system to verify that the times entered are correct for the appliance being controlled.
- After entering and/or adjusting any profile points for any profile, it is the responsibility of the person commissioning the burner system to verify that the resulting fuel air ratio is safe for the appliance being controlled.

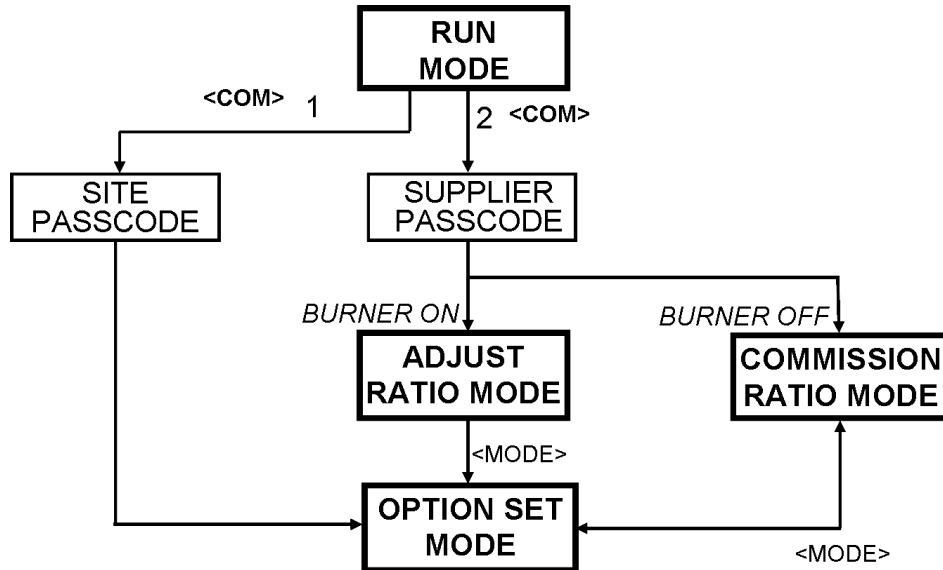


Section 3: Commissioning

1.1 Passcode Access

To set up or change any settings in the controller, you will need to go into Commission mode. Two passcodes are available for this purpose:

- **Supplier passcode** - allows entry to all Commission modes.
- **Site passcode** - allows adjustment of some Option Parameters.



1.2 The Commissioning Process

The process may vary according to the burner and the application, but here are general guidelines that apply.

1.2.1 Typical Programming Steps for a simple Burner System

These are the most likely parameters that you will need to set up:

1. Set the values in options 2.x, 3.x, 4.x, and 5.x if necessary.
2. Set the values in options 6.x to assign the Fuel type for the burner.
3. If special start-up times are required, then set option 1.7=0 and then adjust options 7.x accordingly.
4. If VFD Drives have been defined in the burner configuration, then review and set options 9.x.
5. For Gas burners, set option 10.x parameters to enable the safety valve leak test system.
6. Set either 12.x or 13.x parameters to suit the flame detection system on the burner.
7. Set 14.0 to assign the alarm output – refer to the electrical panel drawings. Review other 14.x options e.g., for pump or gas booster functions.
8. Set option 15.x parameters to configure the modulation input response, and then options 21.x to configure PID loop 1.
9. If the electrical configuration requires interlocks to digital inputs on the NX6300, then set options 16.x, 18.x and 19.x to configure the response of the input and the display message.



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1.2.2 Profiles

A **Profile** defines the operating positions for the fuel and air valves for the burner at different modulation levels, to suit different fuel types, fuel: air ratios, heat output and so on. It is sometimes called a "**Profile Curve Set**".

You can have two separate Profiles stored in the NX6300 system. For example, you might have one Profile for gas with FGR and one without FGR; or you may set up a full-power profile for 10MW (34 MBTU) output, and a reduced-power profile for 6MW (24 MBTU) output.

Within each profile, you can have up to 24 steps (called Set points); but typically, you would use between 15 and 18 Set points.

Your combustion specialist will need to know about the burner type; the kind of process that you are heating; technical information from the burner maker; fuel: air ratios to meet target emission figures, etc., before commissioning the system. Based on this information, they will need to work out the Profile information to program into the ETC Controller system.

1.2.3 Option Parameters

To configure the NX6300, you would program the Option Parameters (stored in memory) that describe the configuration of the burner and the boiler. You can set and adjust certain Option Parameters in Option Set mode, but there are some that you cannot change if the burner is ON - you will need to stop the burner first.

Here is an outline of the Option Parameters that are available:

Option Parameter Quick Reference List:

In this table, the options are grouped to help you refer to them. For a full listing and details of the Option Parameters, please refer to the Appendix.

Option group	Description
0.xx	Digital Communications settings
1.xx	Burner Panel POC (Proof of Closure) 2 nd air switch Safety time configuration.
2.x 3.x 4.x 5.x	Drive (actuator or VSD) channel configuration
6.x	Fuel type assignment
7.x	Special safety time programming
8.x	Flame detection safety timing
9.x	VSD control characteristics
10.x	Safety Gas Valve leak test configuration.
11.x	Reserved, not available.
12.x	IR flame detection configuration.



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Option group	Description
13.x	UV flame detection configuration.
14.x	Alarm relay configuration and Pilot/Main flame configuration.
15.x	Modulation and process input configuration
16.x	Profile change, High Volt input and Oil control configuration.
17.x	Auxiliary relay o/p functions.
18.x	Fail Safe digital inputs functions.
19.x	Fail Safe digital inputs messages.
20.x	Non-critical digital input functions.
21.x	P.I.D. loop 1 configuration.
22.x	P.I.D. loop 2 configuration.
23.x	Process Warming configuration.
30.0 to 42.6	Oxygen probe and trim.
42.7 to 42.9	Air pressure profiling options
45.x	Erase and Restore options.

1.2.4 Setpoints

Within a Profile, the Set-points contain information about the drive positions. A Set-point can refer to the desired running pressure/temperature of the boiler/process, or a set of position data for air and fuel on the profile curve, or a desired Oxygen level that the oxygen trim function will try to attain if configured.

There are two profiles (or tables) of set points available in the NX6300 controller. The profiles may be represented using the table below:

Gas actuator position (°)	Air actuator position (°)		Oil actuator position (°)	Air actuator position (°)
2.1	1.9	CLOSE(P0)	1.7	1.9
2.1	88.9	PURGE(P1)	1.7	88.9
24.6	30.6	IGNITION(P2)	10.6	28.7
21.3	25.8	LOW FIRE(P3)	10.6	28.7
...
76.8	85.6	HIGH FIRE(PX)	50.2	83.5

You can enter up to 24 set points for each profile, including close, purge, and ignition.

You can only enter new set-points in **Commission Ratio** mode.

You can adjust existing set-points in **Adjust Ratio mode** or **Commission Ratio** mode.



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Where Air Pressure Profiling is enabled (Options 42.7 to 42.9), the air pressure at each profile point is stored when the profile set points for the drives are stored.

Summary:

1: You would set up the Profile numbers in Commissioning Ratio mode, with the burner ON. You work through the sequence for one profile set point after the other, right through the sequence. You cannot step backwards to make a correction.

If you make a mistake and miss out a step, you need to start again, using the [NEXT] key to step through to where you made the mistake. Make the correction and store it. Then you can proceed through the other profile set points until you have entered all your data.

2: Then you can test and fine-tune the profile in Adjust Ratio mode with the burner ON, and you can then go to any set point in the sequence as required.

2. How to Commission using the Text Display

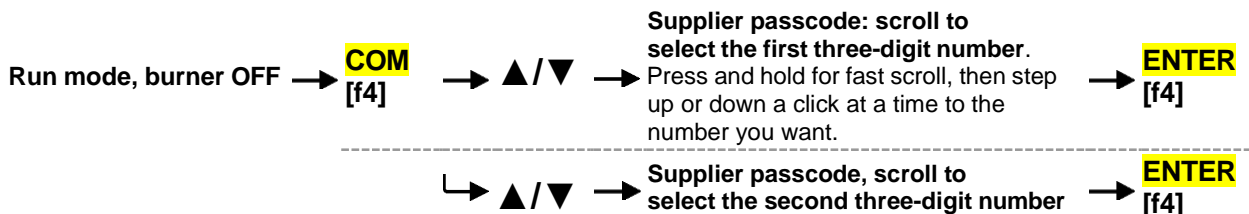


Example text display. The printed fascia may be different on yours, but the display and keys are the same.

2.1 Going into Commission Ratio mode

Commissioning the Fuel/Air Ratio refers to entering the set point data that defines the curves of the Profile(s).

- First, stop the burner. Press **[On/Off]** select 'OFF' then press **ENTER [f4]**.
- After the burner has completely shut down, press the **COM** key. You now have 30 seconds to enter the code numbers.
- Use the **UP/DOWN** arrow keys to scroll to the first three-digit passcode number, then press **ENTER**.
- Repeat to enter the second three numbers, then press **ENTER**.
Here are the steps:



If you entered the correct passcode, the display top line will show **COM**, and the next line will show **P0**, which represents the Closed position set point.



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2.1.1 Changing from Commission / Adjust Ratio mode to Option Set mode

To enter the Option Set mode, first enter Commission Ratio mode or Adjust Ratio mode (see section 2.1, "Going into Commission Ratio mode" or 2.5.2 How to go into Adjust Ratio mode) and press the **OPTS** key.

Commission / Adjust Ratio mode > **OPTS** [f1] > Option Set mode

2.1.2 Changing from Option Set to Commission / Adjust Ratio modes

To change from Option Set mode to Commission Ratio mode, press the **EXIT** key.

Option Set mode → **EXIT** [f1] → Commission ratio / Adjust Ratio mode

2.1.3 Exiting from Commission mode

To exit from any Commission mode you must be in the Commission/Adjust Ratio display mode, then press the key labeled **RUN** and then **EXIT**. For example:

Commission ratio / Adjust Ratio mode > **RUN** [f4] > **EXIT** [f4] > Run mode

2.2 Using the Option Set mode

You can set up or adjust the various Option parameters given in section 2.3.

- Go into Option Set mode as described in section 2.1.1 above.
- Use the **▲/▼** UP/DOWN keys to select the Option parameter to be adjusted. The Option parameter number is shown with a description on the first line, and the value in the second line:

Example at Option parameter = **1.0** and value **5**:

1.0	Powerup Option
= 5	(0 to 360)

- Use the **ADJ** and **BACK** keys to toggle between the top row (Option number) and the bottom row (Option value).
- Use the **▲/▼** UP/DOWN keys to set or change the value of the option parameter. When the correct value is selected, press the **ENTER** key to store the new value.
- Repeat the process to select another Option parameter and set or adjust the values as necessary. When you have finished, exit from Option Set mode.



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2.3 Option Parameter List and Descriptions

Note: the full detailed list of Option Parameters is in the Appendix

Refer to **Option Parameters** in the **Appendix** for full descriptions of how to use these option parameters.

Option	Description	Range
00.1	Sets the SITE Passcode – a 3-digit code that allows access to change a limited selection of parameters.	0-999
00.2	Used to assign a unique serial communications address if required.	0-15
00.3	Set to 1 to reset hours run for all fuels. Hours will be reset to 0 when the burner starts to modulate.	0/1
00.7	Used to set a Modbus serial communications address	0-250
00.8	Configures the Modbus communications speed and parity	0-15
01.0	Power Up mode	0/1 or 2-30
01.1	Keyboard Auto/Manual Enable. The default is '1' and this allows auto/manual to be set from the keypad. If parameter set to '0', this function will be disabled.	1/0
01.3	External profile select input	0 – 6
01.4	Main valve Proof of closure input	0 - 6
01.7	Safety Time Configuration – fixed or adjustable	1/0
02.x	Drive Name - Assigns a name tag to a drive	0-14
03.x	Drive actuator serial number, or speed feedback channel	Text
04.x	Drive usage – defines which profiles the drive is used in	0-15
05.x	Drive options – assigns rotation direction for actuators	0/1
06.0	Fuel options – assigns the Fuel type	0 - 2
07.0	Fan ON early time	0-120
07.1	Air proving time t1	5-120
07.2	Pre-Purge time t2	5-300
07.3	Pre-Ignition time t3	0-10
07.4	Pilot Ignition time t4	1-10
07.5	Pilot Hold time t5	1-30
07.6	Main Ignition time t6	1-10
07.7	Main Ignition Hold time t7	1-30
07.8	Low Fire Hold Time t8	0-999
07.9	Post Purge Time t9	-999 to 999



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Option	Description	Range
08.0	Ignition Spark Output Check	0/1
08.1	Flame failure response time	0/1
08.2	Extended Failure False Flame Time	0/1
08.3	Recycle on pilot failure	0-2
09.0	Inverter (VSD) control accuracy	0/1
09.1	Inverter (VSD) error tolerance	0/1
09.2	Inverter (VSD) closed loop gain	10-125
09.3	Inverter (VSD) stop time	0-100
09.4	Inverter (VSD) acceleration time	1-100
09.5	Inverter (VSD) 1 – speed encoder scalar	255-999
10.0	Gas pressure sensor type	0 – 4
10.1	CAN sensor serial number	0 – 9999
10.2	Nominal (regulated) gas pressure	0-999
10.3	Low pressure limit	0-999
10.4	High pressure limit	0-999
10.5	Leak test volume	0.1-99.9
10.6	Valve leak limits	0.1-99.9
10.7	Vent valve configuration	0-2
10.8	Valve leak test enable and test type	0/1 or 2-360
10.9	Valve energizing time	1-6
12.0	Flame 1 Detection device	0-2
12.1	Pilot flame threshold	0-100
12.2	Main flame threshold	0-100
		0-100
12.4	Flame 1 CAN detector serial number	0-100
13.0	Flame 2 Detection device	0-3
13.1	Pilot flame threshold	0-100
13.2	Main flame threshold	0-100
13.4	Flame 2 CAN detector serial number	0-100



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Option	Description	Range
14.0 to 14.2	Alarm and limit relay assignment	0-4
14.3	Gas pilot type on gas profiles	0/1
14.4	Pilot - MV requirements	0 - 2
14.5	Direct ignition enable for oil	0 - 2
14.6	Spark termination	0 - 3
14.7	Auxiliary Relay function	0 - 6
15.0	Modulation input type. If greater than 0, then the options 15.x marked # below are enabled.	0-4
15.1 #	MV display - decimal position	0-2
15.2 #	MV sensor zero value	0-999
15.3 #	MV sensor span value	0-999
15.4 #	MV display units	0-5
15.5	Process High Safety limit	0 - 9999
15.6	Modulation time	0-120
15.7	CAN Sensor serial number	0 - 999
15.8	Low before OFF	0/1
16.3	Input 5 (TB1-2) configuration	0-488
16.4	Input 6 (TB1-3) configuration	0-488
16.5	Input 5 message assignment, see 19.x below	0-48
16.6	Input 6 message assignment, see 19.x below	0-48
16.7	Oil gun blow out time	0-999
16.9	Second Oil stage point	0 - 23
17.1 to 17.4	Relay output assignments	0-250
18.1 to 18.4	Digital inputs 1 to 4: function assignment	0-468
19.1 to 19.4	Digital inputs 1 to 4: message assignment	0-48
Warning:	Option parameters in the range 20.0 through to 29.9 relate to a default Customer requirements program. If a custom program is installed and enabled by Option 00.4, then the following options up to 29.9 may have different functions. Refer to the equipment supplier if this is the case.	
20.0	PID loop selection input	0-16 or 21-36



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Option	Description	Range
20.1	Burner shutdown input	0-16 or 21-36
20.2	Low Fire Hold input	0-16 or 21-36
21.0	PID Setpoint 1 enable	0/1
21.1	Setpoint 1 control value	0-999
21.2	Setpoint 1 proportional band	0-999
21.3	Setpoint 1 Integral time	0-999
21.4	Setpoint 1 Derivative time	0-999
21.5	Setpoint 1 Limit type	0-2
21.6	Setpoint 1 Low Limit value	0-999
21.7	Setpoint 1 High Limit value	0-2
22.0	PID Setpoint 2 enable	0/1
22.1	Setpoint 2 Set point	0-999
22.2	Setpoint 2 proportional band	0-999
22.3	Setpoint 2 Integral time	0-999
22.4	Setpoint 2 Derivative time	0-999
22.5	Setpoint 2 Limit type	0-2
22.6	Setpoint 2 Low Limit value	0-999
22.7	Setpoint 2 High Limit value	0-2
23.0	Warming Enable	0/1
23.1	Warming Limit	0-999
23.2	Warming Time	0-999
30.0 to 34.4	Oxygen trim system settings	
35.0 to 41.4	Combustion efficiency calculation and flue gas limits	
42.0	Second oxygen probe or CO trim selection	0-9999
42.1 to 42.6	Second probe or CO trim settings	
42.7 to 42.9	Combustion Air Pressure Sensor configuration	0-99%



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Option	Description	Range
44.0 – 44.1	FGR hold-off	
45.0	Erase or restore enable	0/1
45.1	Erase	0 – 5
45.2	Restore command	0 – 999
	END OF OPTION PARAMETERS LIST	



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2.4 Set or Adjust the Fuel/Air Ratio

2.4.1 Description

You would use the Commission mode to enter a new profile or Adjust Fuel/Air Ratio mode to change an existing profile.

Using Commission Ratio mode, you can step through each set point including Close, Purge and Ignition. After a set point has been entered, you cannot go back and modify it again in the same commissioning session. To do this, you must enter all the required set points first, and then use the Adjust Ratio mode.

2.4.2 Using Commission Ratio mode



WARNING

- Use extreme care when you commission the system. While operating in Commission mode, the safety of the system is the sole responsibility of the person commissioning the burner system.
- Make sure you enter a pre-purge position for the relevant drives.
- Incorrect positioning of either fuel or air could cause a hazardous situation to occur.
- If the actuator positions have been uploaded, it is essential to verify combustion at each firing position, to make sure a hazardous condition cannot occur, and for the data to be stored in the controller memory.
- It is recommended that you re-enter the Close position for each actuator as part of the burner service regime, to compensate for wear in the actuator micro-switch during operation.
- After you have adjusted or entered all profile positions, make sure that you validate all new profile points using suitable combustion measurement instrumentation, against published or specified performance criteria.

- To adjust the position of an actuator or speed of a motor, select the device using the LEFT/RIGHT scroll keys, then use the UP/DOWN keys to change the value.

Each set point in the profile is referred to by a letter and number (refer to the table below).

No.	Name	Comments
P0	Close	This defines the positions the actuators will move to when the burner is OFF and must be set to the lowest position that each actuator can reach.
P1	Purge	This defines the positions that the actuator will move to when the burner is purging and can be set as required for each actuator.
P2	Ignition	Position during ignition; this may be outside the normal firing range.
P3	Low Fire	Low Fire set point, (unless limited modulation range is selected).
(Others as required)	



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No.	Name	Comments
Px	High Fire	High Fire set point, (unless limited modulation range is selected), which is the last set point entered (max. P24)

2.4.3 How to Enter or Modify a Profile for a modulating burner

1. Enter Commission Ratio mode (see "Going into Commission Ratio mode" on page 7). P00 (close) is displayed.
2. If the close-set point has recently been entered and no change is required, press **NEXT**. If servicing the burner or the position has not been entered before, move each valve actuator to its lowest position and press **ENTER**. P1 (purge) is displayed (flashing).
3. Select the burner and the required profile. If the purge position has been set before the selected valve actuating motors will automatically move to their relevant P1 positions and stop if no change is required press **NEXT**. Otherwise, move each valve actuator to its required pre-purge position and press **ENTER**. If the purge set point has not been entered before the valve actuators will remain at their respective closed (P00) positions until each valve actuator has been moved to its required position. After all the actuators have been set to the correct position, press **ENTER**. P01 (purge) is displayed. Please note that if a purge position for a particular drive has not been entered before, then the drive will remain at its closed position. **The technician/engineer that is commissioning the system must make sure that the main combustion air damper is set to open enough to purge the boiler.**
4. Wait for the pre-purge time to elapse. If the ignition set point has been entered before, then the drives will move to their ignition positions. After all drives stop moving, P02 (ignition) will be displayed. If a change is required or the ignition set point has not been entered before, move all the valve actuators to their required ignition positions and press **ENTER**.
5. **To attempt ignition of the burner, hold down the **NEXT** key for approximately three seconds.** If you need to change the ignition position, adjust the relevant drive(s) and press **ENTER**, if the position is acceptable press **NEXT**. **After the relevant safety times have elapsed, P03 will be displayed.**
6. If the Low Fire set point has been entered before and no change is required, press **NEXT**. Otherwise, move each drive to the required Low Fire position and press **ENTER**. P4 (next profile set point above Low Fire) is displayed.
7. Repeat step 6 for each required profile set point, up to a minimum of P4 and a maximum of P23.
8. Leave Commission Ratio mode. The last profile set point entered will become the High Fire set point.
 - If a controlled shutdown occurs, the controller will return to step 2. The set points entered in the current commissioning session are not lost and the **NEXT** key can be used to step through the start-up sequence and fire the burner.
 - If a non-volatile lockout occurs, the set points are kept in the same way as for a controlled shutdown. It will be necessary to remove all faults before moving further than step 2.
 - Note: If power is removed from the controller, the set points entered in the current commissioning session will be lost.



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2.4.4 How to Enter or Modify a Profile for a stage-fire burner

When using staged firing for an oil burner the only adjustments will be for the air supply.

1. Enter Commission Ratio mode (see "Going into Commission Ratio mode" on page 7). P00 (close) is displayed.
2. If the close setpoint has recently been entered and no change is required, press **NEXT**. If servicing the burner or the position has not been entered before, move each air valve actuator to its lowest position and press **ENTER**. P1 (purge) is displayed (flashing).
3. Select the burner and the required profile. If the purge position has been set before the selected valve actuating motors will automatically move to their relevant P1 positions and stop, if no change is required press **NEXT**. Otherwise, move each air valve actuator to its required pre-purge position and press **ENTER**. If the purge set point has not been entered before the valve actuators will remain at their respective closed (P00) positions until each valve actuator has been moved to its required position. After all the actuators have been set to the correct position, press **ENTER**. P01 (purge) is displayed. Please note that if a purge position for a particular drive has not been entered before, then the drive will remain at its closed position. **The person that is commissioning the system must make sure that the main combustion air damper is set open enough to purge unburnt gases from the combustion chamber.**
4. Wait for the pre-purge time to elapse. If the ignition set point has been entered before, then the air drives will move to their ignition positions. After all drives stop moving, P02 (ignition) will be displayed. If a change is required or the ignition set point has not been entered before, move all the air valve actuators to their required ignition positions and press **ENTER**.
5. **To attempt ignition of the burner, hold down the **NEXT** key for approximately three seconds.** The controller will energize the MV1 output to ignite the burner. If you need to change the ignition mixture settings, adjust the air drive(s) and press **ENTER**, if the position is acceptable press **NEXT**. **After the relevant safety times have elapsed, P03 will be displayed.**
6. If the Low Fire air damper position has been entered before and no change is required, press **NEXT**. Otherwise, move each air drive to the required Low Fire position and press **ENTER**. P4 (next profile set point above Low Fire) is displayed.
7. Depending upon the setting of option 16.9, when the air position has been set for P4 and the **ENTER** key is pressed the second MV output will be energized. Alternatively, this may be at P5 or even higher.
8. Set an additional air valve position if required by moving the air damper position and pressing **ENTER**.
 - Leave Commission Ratio mode. The last profile set point entered will become the High Fire set point.
 - If a controlled shutdown occurs, the controller will return to step 2. The set points entered in the current commissioning session are not lost and the **NEXT** key can be used to step through the start-up sequence and fire the burner.
 - If a non-volatile lockout occurs, the set points are kept in the same way as for a controlled shutdown. It will be necessary to remove all faults before moving further than step 2.
 - Note: If power is removed from the controller, the set points entered in the current commissioning session will be lost.



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2.4.5 Leaving Commission Ratio mode

To exit from any Commission mode you must be in the Commission/Adjust Ratio display mode, then press the key labeled **RUN** and then **EXIT**. For example:

Commission ratio / Adjust Ratio mode > **RUN** [f4]> **EXIT** [f4] > Run mode

- If P03 (or higher) has been commissioned, the existing profile will be overwritten. If you do not wish the existing profile to be overwritten, disconnect the power to the controller without pressing **RUN** and **EXIT**.
- Only the set points used in the current commissioning session will be stored. For example, if an existing profile has set points up to P15 but only the set points up to P10 were viewed or altered, then only the set points up to P10 will be stored. Therefore, it is vital that **NEXT** is pressed to get to the last set point in the profile before leaving Commission Ratio mode. This does not apply if only the close, purge or ignition set points (P00, P01 or P02) are altered.

2.5 Adjust Ratio mode

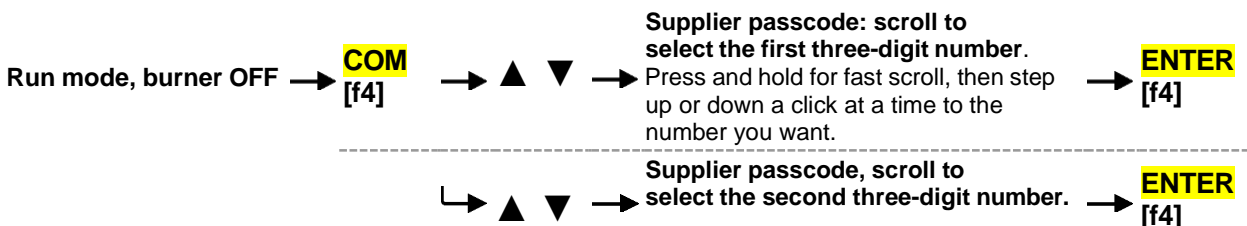
2.5.1 Description

Adjust Ratio mode is used only for changing an existing profile.

- Using Adjust Ratio mode, you can modify the valve actuating motor positions for any set point in the firing range from low to High Fire (P03 and higher).
- You can view all set points (P00 and higher), even with the burner OFF.
- You can adjust the set points in any order.
- You cannot modify any valve actuating motor position so that it is higher than the High Fire set point.
- You cannot modify the close, purge or ignition positions (P00, P01 or P02 respectively). For this, Commission Ratio mode must be used.

2.5.2 How to go into Adjust Ratio mode

- If the burner is OFF then start the burner. Once the burner has started the purge cycle, press the **COM** key. You now have 30 seconds to enter the code numbers.
- Use the ▲ ▼ arrow keys to scroll to the first three-digit supplier passcode number, then press **ENTER**.
- Repeat to enter the second three numbers, then press the **ENTER** key.
Here are the steps:





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If you entered the correct pass code, the display top line will show **COM**, and the next line will show **A03**, with the Low fire set point values. The **A03** will be flashing if the burner is still in the startup sequence or fixed if otherwise.

•

2.5.3 Using Adjust Ratio mode



WARNING

- Use extreme care while commissioning the system. While operating in Adjust Ratio mode the safety of the system is the sole responsibility of the commissioning engineer.
- Incorrect positioning of any drive could cause a hazardous situation to occur.

- To adjust the position of a valve actuating motor or inverter, select the relevant drive using the ◀ ▶ keys.
- To change the set point being modified, using the scroll keys to modify the set point using the ▲ ▼ keys.
- To save the modification, press the **ENTER** key.

Each set point in the profile is referred to with a letter and number.

No.	Name	Comments
A00	Close	You cannot change the Close setpoint in Adjust Ratio mode.
A01	Purge	You cannot change the Purge setpoint in Adjust Ratio mode.
A02	Ignition	You cannot change the Ignition setpoint in Adjust Ratio mode.
A03	Low Fire	Low Fire set point.
.....	
Axx	High Fire	High Fire set point, which was the last set point entered (max P24)

Changing a Set-Point

The procedure for modifying a set point is as follows:

1. Enter Adjust Ratio mode. The display shows 'A n', where n is the number of the set point that is closest to the current firing position.
2. Use the scroll key to select the set point. Use the ▲ ▼ keys to move to the set point in the firing range to be altered.
3. Wait for the 'A n' display to stop flashing then press the **ADJ** [f2] key and modify the drive(s) as required.
4. Press the **ENTER** key to store the new drive positions for the current set point.
5. If the modified positions are not required, then press the [f2] key to return the drive(s) to their original positions and move the highlight to the 'A n' adjustment mode.
6. Repeat steps 2-5 as required. Each time step 5 is completed, the new positions will be stored permanently.



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7. Leave Adjust Ratio mode.

If the 'A n' display is flashing, you cannot adjust the position of any of the drives. This may be for one of the following reasons:

- The burner is not firing. Switch the burner ON and wait for the controller to begin modulating.
- The current set point is A00, A01 or A02. Use Commission Ratio mode to adjust these set points.
- The drive(s) are moving to the required positions. Wait for the drive(s) to stop moving.

2.5.4 Leaving Adjust Ratio mode

To exit from Adjust Ratio mode, press the key labeled **RUN** and then **EXIT**. For example:

Commission ratio / Adjust Ratio mode > **RUN** [f4]> **EXIT** [f4] > Run mode



3. Commissioning Data backup and restore

3.1 The backup process

After commissioning is completed the burner plant will be called upon to run and modulate according to demand from the process. Whilst the burner is modulating in status 16 the controller will send a backup (mirror image) of the commissioning data to the HMI via the CANBus. The backup data is stored in non-volatile memory and can be *restored* to the controller using a sequence of option parameter settings.

The backup process is initiated whenever there have been changes made to either option or curve data. Even a simple change like modifying the application running set-point will cause a new backup to be saved.

Users can interrogate the status of the backup process in several ways as follows:

1. When the burner is running check the value of EK92. If it is less than 999 then a backup is in progress.
2. On the multi-line OLED display press **DATA** then **BKP** to view the backup status screen.
3. On the touchscreen display this information can be found in the 'About' tab in the Screen Configuration menu option.

3.2 Restoring commission data from the HMI

In order to restore commissioned data to the controller ensure that you know the CAN unit address of the controller from which the backup was stored. This is stored as option parameter 0.20.

To restore a commission data backup the procedure is as follows:

1. Enter commissioning mode and - Option set mode.
2. Ensure that the option parameter 0.20 is set to the value of the controller from which the backup was made.
3. Set option parameter 45.0 to a value of 1.
4. Set option parameter 45.2 to a value of 100.
5. Exit commission mode and monitor the restore progress on the HMI. It should take between 20 and 30 seconds.

If the CAN addresses of all devices on the bus match those in the restored backup, then the controller will allow the burner to start and run without further intervention.

Note: The most common cause of a failed restore is when the unit addresses for the backup and the controller do not match.

4. Actuator replacement procedure

In the event of an actuator fault, it may be a requirement to replace the actuator. The manufacturers of the NX6300 recommend that all points on the combustion curve(s) are verified to ensure safe, hazard free combustion.

In some circumstances, the load requirements may not allow the service personnel to operate the burner to the High fire positions. For this reason, the following procedure allows the replacement of the actuator with minimal checking of the combustion curve i.e. Ignition and Low fire combustion.



WARNING

- Use this procedure with extreme care. While operating in Commission mode, the safety of the system is the sole responsibility of the commissioning engineer.
- If an actuator has been replaced, then whenever possible all points on the combustion curve must be verified using commission ratio mode to make sure a hazardous condition cannot occur, and for the data to be stored in the controller memory.
- If the quick verification process is performed, then it is highly recommended to use manual modulation mode to ensure that the burner modulates to high fire without combustion problems.

4.1 The quick verification process

1. Remove power from the burner and change the actuator. Ensure that the output shaft geometry is the same as the original actuator and that the potentiometer and micro-switch geometry are the same as the original actuator.
If there is any doubt on this point, then a full commissioning of the curve will be necessary.
2. Set the power ON and wait for the system to initialize. After initialization a display screen similar to the following screen will be displayed except that the serial numbers will be those of the actuator motors at the site.

```
Drive 1 servo (04Nm) changed!  
Serial 00101--> 00052  
  
Enter code to accept change.  
Code : 000  
  
EXIT          ENTER
```

3. Use the ▲ ▼ buttons to select the code provided by the burner supplier for this function and then press **ENTER** .
4. The controller will ask which profile to verify, as follows:

```
Select profile to verify :  
  
1: GAS  
  
EXIT          ENTER
```



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Highlight the profile to verify, as shown, by using the ▲▼ buttons to select the profile, then press **ENTER** to continue the process.

- The controller will ask for confirmation as follows.

```
Drive 1 servo (04Nm) changed!  
  
Verify pilot & ignition  
MUTE faults to continue...  
  
EXIT ENTER
```

Press and hold the [Mute] button for 4 seconds then press **ENTER** to continue the process.

- The controller will attempt to start the burner and the display will be similar to the following, showing 'L64 Verify Profile':

```
1:GAS N/R AUTO UNITS  
S08 Pre-purge 0:22  
Boiler setpoint 0.0%  
L64 Verify Profile  
MAN LFH DATA COM
```

- When the pilot flame is On, the controller will stop the startup process and ask that the flame is correct as follows:

```
Drive 1 servo (04Nm) changed!  
  
ENTER if pilot OK ?  
  
EXIT ENTER
```

Press **ENTER** if the pilot is correct, OR **EXIT** if adjustment is required.

Note: **EXIT** will abort the process and may require full profile verification.

- After verification of the pilot flame the burner will light the main flame and stop the startup process to ask if the Low fire flame settings are correct as follows:

```
Drive 1 servo (04Nm) changed!  
  
ENTER if low fire OK ?  
Then check to high fire.  
  
EXIT ENTER
```

Press **ENTER** if the main flame is correct, OR **EXIT** if adjustment is required.

Note: **EXIT** will abort the process and may require full profile verification.

- If verification of pilot and main flame is correct, then the controller will return to normal run mode and display C64 to indicate that the process is complete. At this point it is highly recommended to use manual modulation mode to ensure that the burner modulates to high fire without combustion problems.



5. Section 3 Update History

New version	Date		Changes in brief
1pt4	10.27.23	RAL	North America Version

———— End of Section 3 ————

