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The DURApulse GS4 Digital Keypad

The GS4 removable keypad can be installed flat on the surface of the control box (with or without bezel GS4-BZL) with the appropriate hole punched in the control box cover (See Arrow “A”). Use the supplied RJ45 connector and an RJ45 cable to connect to the GS4 drive. The front cover is IP56 rated. The keypad may be mounted remotely and connected to the drive with a standard RJ45 CAT5e straight through patch cable. (An RJ45 crossover cable will NOT work as the keypad extension cable.) The maximum RJ45 extension lead is 5m (16ft). No other wiring is required.

![RJ45 Connector Dimensions](image)

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>mm [in]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>72.0 [2.83]</td>
</tr>
<tr>
<td>Height</td>
<td>116.0 [4.57]</td>
</tr>
<tr>
<td>Depth</td>
<td>15.0 [0.59]</td>
</tr>
</tbody>
</table>

### Descriptions of Keypad Functions

**RUN Key**
- Valid only when the source of operation command is from the keypad.
- The RUN LED light (above the button) turns ON when the drive is running.
- RUN can be pressed even when drive is in process of stopping.
- When in “LOCAL” mode, RUN is only valid when the source of operation command is from the keypad.

**STOP/RESET Key**
- **This key has the highest processing priority in any situation.**
- When the drive receives a STOP command, whether or not the drive is in operation or stop status, the drive will execute a “STOP” command.
- The RESET key can be used to reset the drive after a fault occurs. For those faults that can’t be reset by the RESET key, see the fault records after pressing MENU key for details.

**NOTE:** The ability to STOP the drive from the keypad is effective ONLY if the drive is configured to RUN and/or STOP from the keypad. Keypad STOP can be disabled by parameters such as P3.00, P3.01, P3.03~P3.16.

**Operation Direction Key**
- This key only controls the operation direction and does NOT activate the drive. FWD: forward. REV: reverse.
- Refer to the LED descriptions for more details.

**ENTER Key**
Press ENTER to go to the next menu level. If it is the last level, then press ENTER to execute the command.

**ESC Key**
The ESC key function serves to leave the current menu and return to the last menu. It also functions as a return key while in the sub-menu.

**MENU Key**
Press MENU to return to the Main Menu.

Menu Content:

|----------------|---------------|---------------|----------------|-------|--------------|------------|--------------|-------------|-------------|-------------|

*Continued on next page.*
### Descriptions of Keypad Functions (continued)

#### Direction: Left/Right/Up/Down
- In the numeric value setting mode, the arrows are used to move the cursor and change the numeric value.
- In the menu/text selection mode, the arrows are used for item selection.

#### Function Keys
- **F1** is JOG function.
- The **F2**, **F3** keys are reserved for future use. The **F4** key is used to ADD parameters to the user-defined My-Menu Quick-Start Menu (see “My Menu” in the Quick-Start section of this chapter for more information).

#### LOCAL Key
- This key causes the drive to follow the LOCAL (2nd source) settings for frequency command and operation.* The factory settings of both source of Local frequency and Local operation are the Digital Keypad.
- Pressing the LOCAL key with the drive stopped will switch the operation and frequency to the LOCAL source (P3.01 and P4.01). Pressing the LOCAL key with the drive running can be configured to keep running or to stop upon transition. See P3.58 for more information.
- The selected mode, LOCAL or REMOTE, will be displayed on the GS4-KPD.
- When P3.58=0 then LOCAL correlates to HAND mode. The Digital Input Definition must not be set to 33 (LOC/REM Switch).
*Refer to P3.58 for more detail and other options on how the drive behaves when switching between LOCAL and REMOTE. Refer to P3.00, P3.01, P4.00 and P4.01 for defining LOCAL and REMOTE sources of operation and frequency.

#### REMOTE Key
- This key causes the drive to follow the REMOTE (1st source) settings for frequency command and operation.* The factory settings of both source of Remote frequency and Remote operation are the Digital Keypad.
- Pressing the REMOTE key with the drive stopped will switch the operation and frequency to the REMOTE source. Pressing the REMOTE key with the drive running can be configured to keep running or to stop upon transition. See P3.58 for more information.
- The selected mode, LOCAL or REMOTE, will be displayed on the GS4-KPD.
- When P3.58=0 then LOCAL correlates to HAND mode. The Digital Input definition must not be set to 33 (LOC/REM Switch).
*Refer to P3.58 for more detail and other options on how the drive behaves when switching between LOCAL and REMOTE. Refer to P3.00, P3.01, P4.00 and P4.01 for defining LOCAL and REMOTE sources of operation and frequency.

### Descriptions of LED Functions

#### RUN LED
- **Steady ON**: Drive is running.
- **Blinking**: Drive is stopping or in base block.
- **Steady OFF**: Drive is not running.

#### STOP LED
- **Steady ON**: Drive is stopped or in the process of stopping.
- **Blinking**: Drive is in standby; selected speed reference source is at zero. (If expecting movement, confirm that a speed reference is present.)
- **Steady OFF**: Drive is running.

**NOTE**: The ability to STOP the drive from the keypad is effective ONLY if the drive is configured to RUN and/or STOP from the keypad. Keypad STOP can be disabled by parameters such as P3.00, P3.01, P3.03~P3.16.

#### Operation Direction LED
- Green light is on, the drive is running forward or will run forward when given a run command.
- Red light is on, the drive is running backwards or will run backwards when given a run command.
- Alternating green/red light: the drive is changing direction.

#### ERR_COMM_RUN
These LEDs represent the status of RS-485 communication through COM port 1.

- **RUN-LED Flashing**: RS485 is transferring
- **ERR-LED Red**: Latest Tx or Rx failed
  - **Off**: Latest Tx or RX = OK
- **Flashing**: Please check the RS-485 master for proper configuration/communication, and also check the PLC code for proper operation if serial comm is enabled inside the PLC.
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**GS4 Start-Up Display**

At power up, the Start-up Page displays the DURApulse, GS4 logo. This page is replaced by the Status Page in 3 seconds. Pressing the UP Arrow while the Start-up Page is displayed will show the current keypad firmware.

**Status Page**

Drive status:
- Press the LOCAL key to allow local control of the drive.
- Press the REMOTE key to allow remote control of the drive.
- Pressing the Up and Down Direction keys allow the user to scroll through the Status Page items.
- F X.xx Hz (actual GS4 command frequency)
- H X.xx Hz (actual GS4 output frequency)
- U XXX.x User defined value (in this example P8.00 = 3 DC bus voltage* 
- A X.xx Amp (output amperage)

JOG and time:
- JOG appears above the F1 key and is the function assigned to that key.
- The GS4 internal clock is displayed, center bottom.

**NOTE:** When Power is applied, the keypad will display the startup Page followed by the Status Page. The Status Page displays the GS4 default settings F/H/U/A. While the order F/H/U/A is always fixed, P8.01 can be used to set which value appears on the top row at power-up. The UP and DOWN Arrows will scroll through the display options.

**NOTE:** If an “Err” appears on the keypad after pressing <Enter> in any menu or parameter, then the action did not take affect. The keypad will report back “End” if the action was performed correctly. Ex: writing a value out of range to a parameter will cause a “Err” message.

*NOTE: Refer to Parameter P8.00 in Chapter 4, AC Drive Parameters for a complete list of the values that can be displayed on line 3 of the keypad display. The value in P8.00 is the value that will be shown when the drive powers up. By scrolling to the User Defined row, the Left and Right Direction keys can be used to display any of the other selections available.*
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**Menu Page**

Press the Menu button from any page to access the Menu Page. Use the Up and Down Direction keys to scroll through the Menu content.
Press the Enter key to open the selected Menu content item.

1: Param Setup - Parameter Setup
   Set up the individual drive parameters.
2: Quick Start
   Set typically used parameters to allow quick drive startup.
3: Keypad Lock
   Lock the Keypad.
4: Fault Record
   Display fault information for the drive.
5: PLC
   Run the current PLC program.
6: Copy Param - Copy Parameters
   Save drive parameters to the keypad or drive.
7: Copy PLC
   Copy a previously saved PLC program to the keypad or drive.
8: Displ Setup
   Adjust contrast and backlight settings for the display.
9: Time Setup
   Set the time.
10: Language
   Set the display language.
11: Start-up
   Set the Start-up Page display.

**Param Setup - Parameter Setup Page**

See the individual parameter summary tables in Chapter 4 - AC Drive Parameters for specific parameter explanations and settings.

<table>
<thead>
<tr>
<th>Param Setup</th>
<th>00: MOTOR</th>
<th>01: RAMPS</th>
<th>02: V-Hz</th>
<th>03: DIGITAL</th>
<th>04: ANALOG</th>
<th>05: PRESETS</th>
<th>06: PROTECT</th>
<th>07: PID</th>
<th>08: DISPLAY</th>
<th>09: COMMUNICATION</th>
<th>10: PUMP</th>
<th>11: FAULTS</th>
</tr>
</thead>
</table>
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**QUICK-START – QUICK-START PAGE**

The Quick Start function allows the user to set typically used parameters for quick drive startup and motor protection.

For basic applications, it may only be necessary to enter parameters into the “Basic Configuration” Menu. The “Basic” menu contains Motor definition/protection information and a bare minimum set of parameters that will need to be set. “Control I/O” allows for customization of the most common I/O settings, and each subsequent menu configures additional features and allows more customization of the drive.

*If the GS4 drive has been previously configured, it is advisable to restore the default settings (by using parameter P9.08) before reconfiguring the drive.*

The Quick Start function allows the user to quickly set typically used parameters. Not all of the six Quick Start categories need to be configured for every application, but the categories that are needed for the particular application should be configured in sequential order as shown below (starting with 1:Basic Config).

1: Basic Config
2: Control I/O
3: Enhancements
4: Protection
5: PID
6: My Menu (User Defined Quick Start Menu)

**1: BASIC CONFIG**

Parameters in the Basic Configuration menu:

1. P0.00 Motor 1 Maximum Output Voltage
2. P0.01 Motor 1 Rated Current
3. P0.02 Motor 1 Base Frequency
4. P0.03 Motor 1 Rated RPM
5. P0.04 Drive Maximum Output Frequency
6. P0.08 Motor 1 Rated Horsepower (HP)
7. P0.09 Motor 1 Number of Poles
8. P1.00 Stop Method
9. P1.01 Acceleration Time 1
10. P1.02 Deceleration Time 1
11. P3.00 1st Source of Operation Command [Remote]
12. P3.01 2nd Source of Operation Command [Local]
13. P4.00 1st Source of Frequency Command [Remote]
14. P4.01 2nd Source of Frequency Command [Local]
15. P6.00 Electronic Thermal Overload Relay (Motor 1)
16. P6.01 Electronic Thermal Characteristic (Motor 1)
17. P6.33 Drive Derating Method
18. P6.34 Variable/Constant Torque Duty Selection
19. P9.08 Restore to Default
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2: Control I/O

Parameters in the Control I/O menu:
1. P3.02 2/3 Wire Operation Mode
2. P3.03 Multi-Function Input (DI1)
3. P3.04 Multi-Function Input (DI2)
4. P3.05 Multi-Function Input (DI3)
5. P3.06 Multi-Function Input (DI4)
6. P3.17 Multi-Function Output Terminal 1 (Relay 1)
7. P3.18 Multi-Function Output Terminal 2 (Relay 2)
8. P4.02 Analog Input 1 (AI1) Function
9. P4.03 Analog Input 2 (AI2) Function
10. P4.05 AI1 – I/V Selection
11. P4.06 AI2 – I/V Selection
12. P4.09 Analog Frequency Command for Reverse Run
13. P4.10 AI1 Input Bias (Offset)
14. P4.11 AI1 Input Bias (Offset) Polarity
15. P4.12 AI1 Input Gain
16. P4.13 AI1 Filter
17. P4.15 AI2 Input Bias (Offset)
18. P4.16 AI2 Input Bias (Offset) Polarity
19. P4.17 AI2 Input Gain
20. P4.18 AI2 Filter
21. P4.50 Analog Output 1 (AO1)
22. P4.51 AO1 Gain
23. P4.52 AO1 Negative Value Handle
24. P4.53 AO1 0~20mA/4~20mA Selection
25. P4.60 AO1 Output Constant Level
26. P5.01 Multi-Speed 1
27. P5.02 Multi-Speed 2
28. P5.03 Multi-Speed 3
29. P5.04 Multi-Speed 4

3: Enhancements

Parameters in the Enhancements menu:
1. P1.09 S-curve Accel Time 1
2. P1.10 S-curve Decel Time 1
3. P1.13 Jog Acceleration Time
4. P1.14 Jog Deceleration Time
5. P5.00 Jog Frequency
6. P1.19 Skip Frequency 1 Upper Limit
7. P1.20 Skip Frequency 1 Lower Limit
8. P1.25 DC Injection Current Level
9. P1.26 DC Injection Time During Start-up
10. P1.27 DC Injection Time During Stopping
11. P1.28 Start-Point for DC Injection During Stopping
12. P2.00 Volts/Hertz Settings
13. P2.01 Slip Compensation Gain
14. P2.05 Slip Compensation Filter
15. P2.02 Torque Compensation Gain
16. P2.03 Torque Compensation Filter
17. P2.10 PWM Carrier Frequency
18. P2.11 Control Mode
19. P2.18 Zero Speed Select
20. P6.25 Upper Limit of Output Frequency
21. P2.23 Automatic Energy-Saving Operation
22. P2.24 Power Saving Gain
23. P2.26 Slip Deviation Level
24. P2.27 Slip Deviation Detection time
25. P2.28 Slip Deviation Treatment
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### 4: Protection

Parameters in the Protection menu:

1. P6.04 Auto Restart after Fault
2. P6.05 Reset Time for Auto Restart after fault
3. P6.06 Base Block Speed Search after Fault (oc,ov,bb)
4. P6.09 Fwd/Rev Direction Inhibit
5. P6.13 Auto Adjustable Accel/Decel
6. P6.14 Over-torque Detection Mode (OT1)
7. P6.15 Over-torque Detection Level (OT1)
8. P6.16 Over-torque Detection Time (OT1)
9. P6.26 Lower Limit of Output Frequency
10. P6.28 Dynamic Braking Voltage Level
11. P6.29 Line Start Lockout
12. P6.31 Cooling Fan Control
13. P6.32 PWM Fan Speed
14. P6.45 Output Phase Loss (OPhL) Detection Selection
15. P6.46 Output Phase Loss Detection time
16. P6.47 Output Phase Loss Current Detection Level
17. P6.49 Input Phase Loss Treatment
18. P6.69 Input Phase Loss Detection Time
19. P6.70 Input Phase Loss Ripple Detection
20. P6.50 GFF Detect Current Level (% of INV I-Rated)
22. P6.71 STO Alarm Latch

### 5: PID

Parameters in the PID menu:

1. P7.00 PID Action/Mode
2. P7.03 PID Feedback Gain
3. P7.04 PID Offset Value
4. P7.05 Proportional Gain
5. P7.06 Integral Time
6. P7.07 Derivative Value
7. P7.10 PID Output Frequency Limit
8. P7.11 PID Feedback Loss Speed Level Default
9. P7.12 PID Mode Selection
10. P7.13 PID Reverse Enable
11. P7.14 User Display
12. P7.15 Start-up Display Selection
13. P7.16 User Defined Format
14. P7.17 User Defined Max
15. P7.18 User Defined Setpoint
My Menu allows the user to store up to 32 parameters of their choosing into a custom Quick Start menu. Storing parameters in the My Menu menu can be accomplished in two steps.

**Step 1:**
From the main menu, go to the parameter you want to add under “1: Param Setup.”

**Step 2:**
When you are on the page where you can adjust the parameter value, notice that the word ADD is above function key F4. Press the F4 key to ADD the displayed parameter to “My Menu”.

Select the desired parameter group and parameter to include in the My Menu menu. Press Enter to add the selected parameter to My Menu.

To delete a My Menu parameter, in the My Menu menu, position the cursor next to the parameter you wish to delete and press Enter.

Notice that “DEL” appears above the F4 key. Press the F4 key and then Enter to delete from My Menu.
Keypad Lock is used to lock the keypad from unintentional activation during operation.

Press the Enter key to lock the keypad.

The Status Page will again display.

Pressing ANY key will display the message Press ESC to Unlock Key.

Press and hold the ESC key for 3 seconds to unlock the keypad. The display will return to the Status Page.
Fault Record - Fault Record Page

GS4 drive faults are stored from 1: to 20:. Refer to Chapter 6: Maintenance and Troubleshooting for a complete list of fault messages that may appear. Use the Up and Down Direction keys to scroll through the list.

1:
2:
3:

▲
▼

18:
19:
20:

Press the Enter key to display information about the drive status when the fault occurred.

Fault Record

▲ 001: Lvn
5 002:
5 003:

1: Lvn

▲ Date: 05/15/2016
▼ Time: 08:51:10

OutFreq: 60.00

Date: 00/00/0000
Time: 00:00:00
OutFreq: 0.00
OutAmp: 0.00
OutVolt 0.0
DCBus: 0.0
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PLC Function is used to Enable/Disable and Run/Stop the internal PLC. The active selection is marked by a smiley face character on the far right of the display.

**WARNING:** ON A POWER CYCLE THE PLC RUN/STOP STATE WILL BE DETERMINED BY THE LAST STATE THE KEYPAD WAS PLACED IN, OR BY THE CONFIGURED DIGITAL INPUTS. IF THE STATE WAS CHANGED VIA GSLogic, THAT RUN/STOP STATE MAY NOT BE TRUE ON A POWER CYCLE.

Use the Up and Down Direction keys to select Disable, PLC Run or PLC Stop.

Press the Enter key to confirm the selection.

Selecting PLC Run will activate the GS4 internal PLC. The keypad status Page will display PLC/RUN at the top, center of the display. If PLC Stop is selected, the PLC program will stop and the Status Page will display PLC/STOP at the top center of the page. Selecting Disable will disable the GS4 internal PLC and return control to the drive. Selecting PLC Run or PLC Stop also can determine whether the physical I/O are controlled by the Drive or are controlled by the PLC. See Chapter 8 for more information on the integrated PLC and GSLogic software.
**Copy Param - Copy Parameters Page (Keypad Copy)**

Copy Parameters is used to save up to four drive configurations into the keypad. The keypad can then download any of these configurations into the drive, or it can be moved to a different drive and download the parameter settings of the original drive. Use the Up and Down Direction keys to scroll through the four available copy parameter locations. If a field is blank, then no copy has been made to that location.

- 001: ExhaustFan
- 002: IntakeFan1
- 003: Filename02
- 004:

Press the Enter key to select the desired location for writing the current parameter settings.

- 001:
  - 1: Keypad→VFD
  - 2: VFD→Keypad

Use the Up and Down Direction keys to select Keypad→VFD to copy the current parameter settings from the keypad to the drive or VFD→Keypad to write the current parameter settings from the drive to the keypad. Press the Enter key.

**VFD→Keypad**

When VFD→Keypad is selected, the keypad will prompt you for a filename to save the existing configuration into. Use the Left/Right Arrows to scroll from character to character and the Up/Down Arrows to change the alphanumeric character. Pressing Enter will begin the transfer of parameters from the drive into the keypad.

**Keypad→VFD**

When Keypad→VFD is selected, the keypad will begin the transfer of the preselected file parameters from the keypad into the drive. As shown in the example to the left, “001” is the file to be transferred. *(NOTE: P9.06, Parameter Copy Enable, must first be set to 1.)*

Pressing F4 while in the Copy Param menu will prompt you to Delete All 4 saved programs (“Press ENTER to clear”).
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**COPY PLC - COPY PLC PAGE**

Copy PLC is used to copy previously saved PLC program from the keypad to the drive or from the drive to the keypad. Use the Up and Down Direction keys to scroll through the four available Copy PLC locations. If the field is blank, then no copies have been made.

Press the Enter key to select the desired location for writing the current program.

Use the Up and Down Direction keys to select Keypad→VFD to copy the previously saved PLC settings from the keypad to the drive or VFD→Keypad to write the current PLC program from the drive to the keypad.

When VFD→Keypad is selected, the keypad will prompt you for a filename to save the existing configuration into. Use the Left/Right arrows to scroll from character to character and the Up/Down arrows to change the alphanumeric character. Pressing Enter will begin the transfer of PLC program from the drive into the keypad.

When Keypad→VFD is selected, the keypad will begin the transfer of PLC program from the keypad into the drive.
**DISPL Setup** - **Display Setup Page**

The Display Setup Page allows the user to adjust the Contrast, Backlight time and Text Color of the display.

1: Contrast

2: Backlight

3: Text Color

**Contrast**

Use the Up and Down direction arrows to adjust the Contrast to the desired setting.

The range of adjustment is from -20 to +20.

The default value is 0.

Entering a value of 0 will keep the backlight ON all the time.

**Back-Light**

Use the Up and Down direction arrows to adjust the time when the display backlight turns off. The range of adjustment is from 0 to 10 minutes. The default value is 5 minutes.

**Text Color**

Use the Up and Down direction arrows to select from white text or blue text for the display.

**TIME Setup** - **Time Setup Page**

The Time Setup Page allows the user to change the date and time.

The date format is Year/Month/Day. Time is displayed in 24-hour clock format and is displayed as Hours:Minutes:Seconds. Use the Right and Left Arrow keys to move the cursor to the desired location and use the Up and Down Arrow keys to adjust the setting.

After adjusting the time, move the cursor to the Seconds entry before pressing the Enter Key.

The real time clock (RTC) is maintained in the keypad. A capacitor is used to provide power for the RTC during power loss. The capacitor can maintain power for the RTC for 7 days with no drive power applied.

**LANGUAGE** - **Language Page**

The Language Page sets the language shown on the display. Select from English, Spanish or French.
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**Start-up - Start-up Page**

The Start-up Page allows the user to select from three different screens that display during initial start-up. Default1 setting displays the GS4 logo screen, Default2 setting displays “Initializing, Please Wait.”

**Keypad Fault Codes**

Following are the fault codes and descriptions for the GS4-KPD. To reset the fault codes press the Enter and Reset buttons simultaneously. These faults indicate either a communication error between the keypad and the drive or a keypad failure. To correct: 1) Inspect and clean the RJ45 connectors on the back of the keypad and the RJ45 connector leading into the drive. 2) Replace the cable and/or RJ45 M-M adapter with a standard Ethernet patch cable. 3) If the RJ45 connections are OK, replace the keypad.

<table>
<thead>
<tr>
<th>ID No.</th>
<th>Description</th>
<th>Corrective Actions</th>
</tr>
</thead>
</table>
| Fault | Keypad flash memory read error. | An error has occurred on keypad’s flash memory.  
1. Press RESET on the keypad to clear the error.  
2. Verify what kind of error has occurred on keypad’s flash memory.  
3. Shut down the system, wait 10 minutes and power up the system.  
If the error remains contact technical support. |
| Fault | Keypad flash memory save error. | An error has occurred on keypad’s flash memory.  
1. Press RESET on the keypad to clear the error.  
2. Verify what kind of error has occurred on keypad’s flash memory.  
3. Shut down the system, wait 10 minutes and power up the system.  
If the error remains contact technical support. |
| Fault | Keypad flash memory parameter error. | Errors occurred on factory setting parameters possibly caused by firmware update.  
1. Press RESET on the keypad to clear the error.  
2. Verify if there is a problem on the FLASH IC.  
3. Shut down the system, wait 10 minutes and power up the system.  
If the error remains contact technical support. |
| Fault | Keypad flash memory when read AC data error | Keypad can’t read data from drive.  
1. Verify if the keypad is properly connected to the drive with the RJ45 connector.  
2. Press RESET on the keypad to clear the error.  
3. Shut down the system, wait 10 minutes and power up the system.  
If the error remains contact technical support. |
| Fault | Keypad/Drive parameter file mismatch. | There has been an attempt to copy an incorrect file between the keypad and the drive. Ensure that there is a valid file in the keypad (if attempting Keypad → VFD transfer). |