=== Full-series model (reference) ===ARIMA(2,1,0)(1,0,0)[24]

Coefficients:

ar1 ar2 sar1

-0.0232 -0.0179 0.1561

s.e. 0.0108 0.0107 0.0107

sigma^2 = 0.83: log likelihood = -11611.01

AIC=23230.02 AICc=23230.03 BIC=23258.34

Training set error measures:

ME RMSE MAE MPE MAPE MASE ACF1

Training set -0.0006191196 0.9108108 0.6193663 NaN Inf 0.2921733 1.87682e-05

Criteria: AIC = 23230.02 AICc = 23230.03 BIC = 23258.34

> # Residual diagnostics (ACF/PACF + Ljung–Box at daily & weekly)

Ljung–Box (daily lag 24):

Box-Ljung test

data: residuals(fit\_ts)

X-squared = 292.11, df = 24, p-value < 2.2e-16

Ljung–Box (weekly lag 168):

Box-Ljung test

data: residuals(fit\_ts)

X-squared = 1967.2, df = 168, p-value < 2.2e-16

> # Plot residual checks (ACF/PACF + normality) in the Viewer

> checkresiduals(fit\_ts)

Ljung-Box test

data: Residuals from ARIMA(2,1,0)(1,0,0)[24]

Q\* = 578.04, df = 45, p-value < 2.2e-16

Model df: 3. Total lags used: 48

=== Train-only model (before holdout forecast) ===

Series: y\_train

ARIMA(2,1,0)(1,0,0)[24]

Coefficients:

ar1 ar2 sar1

-0.0227 -0.0178 0.1563

s.e. 0.0109 0.0108 0.0108

sigma^2 = 0.8414: log likelihood = -11446.88

AIC=22901.76 AICc=22901.77 BIC=22930

Training set error measures:

ME RMSE MAE MPE MAPE MASE ACF1

Training set -0.0004877748 0.91704 0.6244287 NaN Inf 0.2933598 6.752678e-06

Train Criteria: AIC = 22901.76 AICc = 22901.77 BIC = 22930

> # Train residual diagnostics (useful in HW)

Train Ljung–Box (lag 24):

Box-Ljung test

data: residuals(fit\_train)

X-squared = 288.67, df = 24, p-value < 2.2e-16

Train Ljung–Box (lag 168):

Box-Ljung test

data: residuals(fit\_train)

X-squared = 1934.6, df = 168, p-value < 2.2e-16

> checkresiduals(fit\_train)

Ljung-Box test

data: Residuals from ARIMA(2,1,0)(1,0,0)[24]

Q\* = 571.74, df = 45, p-value < 2.2e-16

Model df: 3. Total lags used: 48

=== Hold-out accuracy (last 7 days) ===

ME RMSE MAE MPE MAPE MASE ACF1 Theil's U

Training set -0.0004877748 0.917040 0.6244287 NaN Inf 0.2933598 6.752678e-06 NA

Test set -0.5479524729 1.477806 1.2459309 -21.88889 32.07778 0.5853448 9.330190e-01 4.121843

=== Expanding-window backtest summary ===

Horizon RMSE MAE MAPE

1 1-step 0.9570231 0.5698761 2.092937e+07

2 24-step 2.7273033 1.9230151 2.370889e+01

3 168-step 3.4472063 2.6668602 3.254071e+01